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PROCEEDINGS
OF THE
STATE HORTICULTURAL
ASSOCIATION OF
PENNSYLVANIA
FOR
1923

SIXTY-FOURTH ANNUAL MEETING
HELD IN HARRISBURG
JANUARY 23-25, 1923

State Horticultural Association of Pennsylvania

OFFICERS AND COMMITTEES FOR 1923

President: C. ARTHUR GREIST - - - - - Guernsey
First Vice President: H. C. BRINTON - - - - - Hanover
Second Vice President: S. R. HUEY - - - - - New Castle
Secretary: S. W. FLETCHER - - - - - State College
Treasurer: EDWIN W. THOMAS - - - - - King of Prussia

VEGETABLE GROWERS' SECTION

Third Vice President: W. H. WEINSCHENK, *Chairman* - - - - - New Castle
Secretary: W. B. NISSLEY - - - - - State College

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The above officers, and all Presidents of County Horticultural Societies affiliated with the State Association.

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GAME LAWS

Referred by the President to the Legislative Committee

JOINT COMMITTEE ON STANDARDIZATION OF PACK

CHESTER J. TYSON, Flora Dale, *Chairman*
R. J. GILLAN, St. Thomas W. E. GROVE, York Springs

CONSTITUTION

Article 1. — Name and Object. The name of this organization shall be The State Horticultural Association of Pennsylvania. Its object shall be to foster and encourage the development of horticulture in the State of Pennsylvania.

Article 2. — Membership. Any person may become an Annual Member of this Association by paying two dollars (\$2.00) to the Secretary, such membership to expire on the first day of the following annual meeting, unless renewed. Any one paying twenty dollars (\$20.00) to the Secretary at one time shall be entitled to Life Membership. Persons of distinguished merit in horticulture may be elected to Honorary Membership for the **current year**, by a majority vote of the members present at any regular meeting.

Members of County or local Horticultural Societies shall be granted membership in the State Association under the following conditions:

(1) The County, Local or District Society shall have at least fifteen paid up members, and shall hold at least one meeting a year.

(2) The Secretary of the County, Local or District Society shall remit to the Secretary of the State Association annually one dollar for each member before January 31 of each year which shall be their dues in the State Association for the year.

(3) The Secretary of the County, Local or District Society shall transmit to the Secretary of the State Association annually, at the call of the State Secretary, a list of its officers and members together with a brief report of its work, particularly of those matters that are of general interest to the Horticulturists of the State.

(4) The State Horticultural Association shall publish these reports in its Proceedings which shall be distributed to the membership of those County, Local or District Societies that have complied with these provisions.

Article 3. — Officers. The officers shall consist of a President, three Vice Presidents, a Secretary and a Treasurer, all of whom shall be elected by ballot at each annual meeting, to hold office for one year or until their successors shall be chosen, except that the retiring Secretary shall edit the report of the annual meeting at which his successor is elected. No one may serve as President for more than two consecutive terms. These **elective** officers shall constitute an Executive Board in conjunction with an additional indeterminate number of Vice Presidents whose names shall be announced by the Secretary at the annual election of officers. These Vice Presidents shall be the regularly elected Presidents of any County Associations,

organized in Pennsylvania for horticultural purposes, whose Constitution is approved by the Executive Board, and whose income from annual membership dues during the preceding year was not less than ten dollars (\$10.00). In order to secure admittance to this Board, the Secretary of such County Association shall certify to the Secretary of the State Association that the applicant has been duly elected to serve as their President for the current year and shall also submit a statement showing number of members and amount of dues paid for the preceding year. All officers must be members of the Association in good standing at the time of their election and shall assume their duties at the close of the meeting at which they were elected.

Article 4. — **Quorum.** Twenty-five (25) members of the Association and five (5) members of the Executive Board shall constitute a quorum for the transaction of business.

Article 5. — **Standing Committees.** The following Standing Committees shall be appointed by the President to serve during his term of office: A Committee on Legislation, to consist of three (3) members; a Committee on Exhibitions, to consist of five (5) members; a Committee on Membership, to consist of one (1) member from each County in the State showing evidence of horticultural activity, and a General Fruit Committee, consisting of one from each County represented, with a general chairman of the whole, each member of the General Fruit Committee to have the privilege of appointing two assistants.

Article 6. — **Annual Meeting.** The Annual Meeting of this Association shall be held during the month of January in each year, at such time and place as the Executive Board shall determine. The regular meetings of the Association shall be closed to all persons, except paid-up members of the Association, speakers, delegates from associations outside of Pennsylvania, all ladies, and the minor sons of members.

Article 7. — **Amendments to the Constitution.** This Constitution may be amended by a two-thirds vote of the members present at any annual meeting, provided such amendment shall have been presented to the Secretary in writing at least sixty (60) days prior to time of holding the annual meeting, and by him referred to all members in connection with the announcement of said meeting.

BY-LAWS

Article 1. — **Duties of the President.** The President shall be the executive officer of the Association and of the Executive Board, and shall preside at all meetings of either body, designating one of the Vice Presidents to serve in his stead when

necessarily absent. He shall pass upon all bills and accounts of the Association before they are ordered paid by the Secretary; he shall appoint all delegates to other associations and all special and standing committees of the Association unless otherwise ordered.

Article 2. — **Duties of Vice Presidents.** The Vice Presidents shall serve on the Executive Board and any one of them may be called upon by the President or the Executive Board to assume the duties of the Chair at any meeting. They shall also actively represent the Association in its various lines of work in their respective counties.

Article 3. — **Duties of the Secretary.**—The Secretary shall be the recording, corresponding, and accounting officer of the Association and of the Executive Board; he shall incur no expenditure of a large or doubtful character without the sanction of the Business Committee; he shall secure the written approval of the President on all bills or claims against the Association before drawing his order on the Treasurer for the payment thereof; he shall attend all meetings of the Association and of the Executive Board and shall keep a faithful record of their proceedings; he shall sign all certificates of membership and all Diplomas and Certificates of Merit, awarded by the Association. All money received by him shall be promptly paid to the Treasurer. He shall have charge of the Association's books and papers and shall be responsible to the Board for all property placed in his charge; he shall be the custodian of the Seal of the Association, and shall have authority to affix same to documents when needful; he shall seek by all suitable means to secure the fullest announcement of the meetings of the Association in this State, as well as in adjacent States, when such shall be found desirable. It shall also be his duty, yearly, to prepare for publication, the Annual Report of the Association, together with such other matter as he shall deem proper, he being aided in the selection of such matter by an advisory committee of the Executive Board. As recompense, the Secretary shall receive all necessary expenses, and such salary as may be determined by the Executive Board.

Article 4. — **Duties of the Treasurer.** All the funds of the Association shall be paid into the hands of the Treasurer; he shall disburse the moneys of the Association that shall come into his hands only upon order of the Secretary, countersigned by the President; he shall keep the moneys received by the Association for Life Memberships as a distinct fund, and shall invest the same under the advice and direction of the Executive Board, applying only the interest accruing thereon to the purpose of the general fund. Immediately upon assuming his office and before entering upon his duties, he shall execute to the Association an official bond with sufficient securities conditioned for the safe-keeping and disbursement of the moneys of

the Association, and for the proper discharge of the further duties of his office, in such sum as shall be specified by the Executive Board, the premium on which shall be paid by the Association. This bond shall receive the approval of the President, and shall be deposited with the Secretary. Immediately preceding the annual meeting, he shall submit to the Executive Board a written report showing the amount of money that shall have come into his hands during the year, the sources from which it has been derived, and the disposition made of the same. This statement shall be published in the Annual Report of the Association.

Article 5. — Duties of the Executive Board. The Executive Board shall enact all rules and regulations for the management of the affairs of the Association, determine the salaries of its officers, and assume the control and management of its exhibitions; it shall have power to displace any officer of the Association for neglect of duty or abuse of position; shall fill all vacancies by appointment to continue until the next annual election; and shall hold at least two (2) regular sessions during the year, one of which shall occur at the time and place of the Annual Meeting of the Association. It may hold other meetings when called by the Secretary under the advice or direction of majority of the members of the Board at such times and places as may be deemed most convenient, but in all such cases, each member must be duly notified of the time, place, and object of such meeting; it shall carefully guard the interests of the Association, watch over its finances and provide for its necessities as they shall arise; it shall appoint from its own number three members, who shall constitute a Business Committee for the year, and upon which the Secretary and Treasurer may not serve; and it shall submit to the Annual Meeting, through the Secretary, such report upon the condition, general interests, and prospects of the Association as it shall judge necessary or expedient. All important measures shall be submitted to this Board, but may, by the Board, be resubmitted to the Association for recommendations.

Article 6. — Duties of the Business Committee. It shall be the duty of the Business Committee, upon application of the Secretary, during the recess of the Executive Board, to advise with him as to the expediency of making any contemplated but questionable expenditure for which occasion may arise during such recess. The Business Committee shall also audit the accounts of the Secretary and the Treasurer just prior to the annual meeting and submit written reports of its findings to the Executive Board.

Article 7. — Duties of the Standing Committees. (1) The Committee on Legislation shall inform itself in regard to such existing laws as relate to the horticultural interests of the

State and bring the same to the attention of the Association, at the same time reporting any additional legislation which in their judgment is desirable; when so directed by the Association, it shall cause to be introduced into the State Legislature such bills as may be deemed necessary and shall aid or oppose any bills introduced by others which directly or indirectly affect the interests of the fruit grower.

(2) The Committee on Exhibitions shall suggest from time to time such methods and improvements as may seem to them desirable in conducting the exhibitions of the Association, as well as other fruit exhibitions throughout the State, and with the assistance of the Executive Board, shall arrange the premium lists, and have charge of all the exhibitions of the Association.

(3) The Committee on Membership and Expansion, with the cooperation of the County Vice Presidents, shall bring the work of the Association to the attention of fruit growers throughout the State, and by such means as they deem best, strive to increase the membership.

(4) The General Fruit Committee shall carefully and thoroughly investigate the subject of fruit culture in general. Each local committee of three shall collect such useful and interesting information in relation to the subject as may be in their power, and embody the same in monthly reports, to be made to the general chairman; such reports to be by him examined and embodied in his annual and semi-annual reports.

Such other standing Committees may be created by the Executive Board from time to time, as in its discretion may seem desirable or necessary.

All standing committees shall report to the Annual Meeting in January, any information of value to the Association or its members, that may have come to their knowledge during the year, as well as any scientific theories, deductions or facts that in their opinion may be useful in advancing the object for which the Association is laboring.

Article 8. — Nomenclature. The Association shall adopt the nomenclature of the American Pomological Society.

Article 9. — Amendments to By-Laws. Amendments or additions to these By-Laws may be made by a majority vote of the Executive Board at any meeting, but if objection shall be made, the same shall "lie upon the table" till the next regular meeting of the Board. These By-Laws, or any one or more of them, may be suspended for the time, by order of a majority of all the members of the Association present and voting. A proposition in the general meeting of the Association for an amendment or addition to these By-Laws shall be referred to the Executive Board for consideration and decision, but the Association may submit therewith its advice or request.

OPENING SESSION

Wednesday Morning, January 24th

PRESIDENT'S ADDRESS

S. W. FLETCHER, State College

Our program is full of interesting and timely topics. Numerous questions have been submitted by our members for discussion. We are bound to consider all of these, even though briefly, before the meeting closes. It is evident that the presiding officer will have difficulty in carrying out the program unless everybody remembers that "Brevity is the soul of wit". Hence it is incumbent on me, at the very beginning of the meeting, to set a good example and join the ranks of "Five-Minute-Men".

Membership. — The Association has made progress during the year, especially in membership. The present membership is 620, a gain of 110 over the membership of a year ago. Most of the increase has been derived from County Horticultural Societies, in accordance with the plan of affiliation adopted at the last annual meeting. Five county societies — Adams, Franklin, Lancaster, Berks and Chester-Delaware have affiliated and paid dues to the State Association for their entire membership. Berks has voted favorably, but has not paid dues. York, Lebanon, Lawrence, Wyoming, Cumberland, Lackawanna, Perry and Wayne are thinking about it. Movements to organize County Societies are under way in Luzerne, Bedford, Beaver and several other counties. The five county societies already affiliated have a combined membership of 260, over 160 of whom have never been members of the State Association before. The advantages of affiliation, both to the County Societies and to the State Association, are so obvious that there is bound to be a steady increase in membership from this source. I predict that the State Association will have 1,000 members by 1924.

Finances. The finances of the Association are on a substantial basis. There is a balance of over \$900 in the treasury, after paying all bills, including the bill for the last Proceedings, which was one of the largest and best that the Association has ever published. For many years the Association was burdened with debt, and its usefulness was greatly impaired thereby. We are out of debt now, and must see to it that we stay out.

It is evident that there is little prospect of securing a State appropriation, as do the Horticultural Societies of practically all of our neighboring States except New York. Very well, we shall go ahead, pay our own way, and take pride in doing so. This means, however, that we must have a large membership. Members of County Societies pay only one dol-

lar, instead of two, so that 1,000 members does not mean a \$2,000 income; but we covet their cooperation and interest more than their dollars.

The largest item of expense is the printing of the Proceedings which amounted to about \$600 this year. There is room for a very considerable saving here through the inclusion of more advertising matter. Now that we have 600 members and are on the way to having 1,000, we are in a position to make our annual report an attractive field for the advertising of horticultural supplies. In order to make this proposition interesting to dealers, the Report must be distributed before the season opens, certainly by April fifteenth. Printers' strikes and other vexatious delays prevented an earlier distribution this year.

Quarterly Publication. I recommend, also, that steps be taken, as an economy measure, to secure second class postage rates for the publications of the Association, these to be issued quarterly, under the title, "Pennsylvania Horticulture" as follows: In March, the Annual Proceedings; in June, a two-page sheet, giving plans for the Summer Meeting, and other timely notes; in September a two-page sheet, giving the premium list of the fruit show, and other timely notes; in December, the program of the annual meeting. This would save money, and also keep the members in touch with the association between annual meetings, lack of which has been one of our greatest handicaps thus far.

Summer Trip. The Summer Trip of the Association, through some of the best orchards of New Jersey, was taken by about fifty of our members and was very much worth while. We are under obligation to the New Jersey fruit growers, and to the officials of the New Jersey State Agricultural Experiment Station and Extension Service, for their courtesies. A smaller group visited the Central Packing Houses of Western New York, in September. Definite interest in the organization of central packing houses in at least three points in Pennsylvania may be traced to that trip.

I suggest that the Association trip next summer be in the western part of the state, say in Lawrence and adjacent counties. Many excellent horticultural enterprises are developing there which I feel sure would interest our members fully as much as a trip outside the state. Moreover, we ought to have a larger membership from the Pittsburgh district and this is the best way to get it. It would be desirable to have at least a half day meeting, for discussion of timely topics, in connection with the inspection trip.

Premium List. At a meeting of the Directors of the Farm Products Show, your representatives urged a revision of the premium list that would offer greater inducements to exhibitors. The premiums were accordingly increased very mate-

rially and a class for exhibits by County Horticultural Societies was added, carrying the attractive premiums of \$100, \$75, and \$50 for first, second, and third premiums respectively. In order to secure these increases, we were obliged to assure the Directors that they would bring out a much larger display than heretofore, and it was also necessary to provide that apples winning first premium shall become the property of the Farm Products Show. We trust that the fruit show of this year will justify our arguments and our faith.

This has not been a "boom year" in Pennsylvania horticulture, taking the state as a whole, but one thing is certain, the fruit growers and gardeners of Pennsylvania have come through these years of depression and deflation with as good heart as any of their competitors, and better than most of them. Our industry is on a substantial basis. We know that the average of all the years, fat and lean will be fair to the man who does his work well.

RECENT IMPROVEMENTS IN ORCHARD SPRAYING EQUIPMENT AND MATERIALS

A. FREEMAN MASON, Extension Specialist in Horticulture,
New Jersey Agricultural Experiment Station, New Brunswick, N. J.

No phase of horticulture is more intensely interesting than the constant battle waged by the fruit-growers against the ever-increasing army of orchard and garden pests. The literature dates back hundreds of years, yet even as it was written attacks of newer insects, and more modern methods of control made it out of date. Human warfare has advanced from the stone and sling and spear of the ancient host to the present day gun and super-dreadnaught. The fruit-grower has advanced from the whisk-broom and syringe to the modern high-power park sprayer and the aeroplane duster. A comparison of the materials used shows progress just as marked.

The Beginning of Spraying. Until the value of Paris green as an insecticide was discovered, between 1860 and 1870, and Bordeaux mixture in 1882, the spray materials were made chiefly from vile-smelling or evil tasting substances. Cow manure, urine, and vinegar were then three bulwarks in the growers defence, and even to this day we find occasional growers using cow manure and clay as a dressing for grafting or pruning wounds. From Paris green have developed our present arsenates, while Moxdeaux mixture is still used. Sulphur in various forms has been used for more than one hundred years. The first manufacture of commercial concentrated lime-sulphur is attributed to a French gardener named Grison, in 1851, although an Englishman claims to have used it in 1845.

The greatest steps in spraying have come with the advent of some serious pest. The San Jose Scale is perhaps the outstanding example of this. Appearing first in 1871, at San Jose, California, it spread East with nursery stock shipments, and became serious in the East about 1890. From that time on it raged all over the country. Whole orchards were wiped out. Millions of dollars of damage was done. It drove thousands out of the fruit business. It reduced one great Jersey peach district, where 7,000,000 trees were planted, to a general farming section. But it forced growers to spray generally and thoroughly. It made the necessity of large-capacity power outfits apparent. The first power sprayer appeared in 1894, a clumsy steam outfit, capable of developing 100 to 150 pounds pressure, and of running two leads of hose.

Recent Improvements in Apparatus. Of late years the constant increase in the number of sprays to be applied, the development of large commercial orchards, as compared with the farm orchards which had hitherto supplied so much of the fruit, and the low margins of profits, have concentrated the efforts of both growers and manufacturers toward reducing labor and time in spraying. The most notable advances have been the increase in the capacity of power sprayers, the development of better water supplies, the spray-gun, and the dusting machines. The orchard sprayer unit is now about 30 acres. For this acreage at the present time a 200 to 300 gallon tank, 4 horse-power engine, and a pump with a possible discharge rate of 12 to 15 gallons per minute through two leads of hose, is needed. When larger orchards have but one sprayer, the margin of safety is correspondingly smaller.

The location and extent of the water supply is also important. Large storage tanks, holding enough for a day's spraying are frequently placed at convenient spots in the orchard, with gravity flow to the spray tanks. Perhaps supply wagons carry the water from the supply to the sprayers. In occasional places in the far west they have gone to the extreme of piping whole orchards so that the spray, mixed and pumped at a central place, is forced directly into the orchard, to faucets between every fourth to eighth tree in every fourth to eighth row, from each of which from 16 to 64 trees may be sprayed with one lead of hose. One cannot help but wonder about the expense of such a scheme, and what will happen to it in the next few years when dusting is perfected, and is in general use.

The Spray-Gun. The spray-gun is perhaps the best known and most important spraying invention in the past decade. It came into instant popularity. Short, light, with a type of stream and rate of flow that is easily adjustable, and a very large capacity, its boosters claimed great things for it, and justly so. In the right hands, under the right conditions, it

is most effective. But it has its drawbacks. The heavy stream, if not cautiously used, may injure foliage, and unless sufficient power is used it will not give sufficient coating in the tops of the trees to get control.

At the Council Bluffs meeting of the American Pomological Society, Leroy Childs, superintendent of the Hood River, Oregon, Experiment Station, discussed the spray-gun. His conclusions were that to give satisfactory results the spray-gun must discharge from five to seven gallons of material per minute, at a pressure of from 300 to 325 pounds at the nozzle; (325-350 at the pump), and that to get that capacity at that pressure a $\frac{1}{4}$ to $\frac{3}{4}$ inch aperture must be used in the disc. When the pressure was reduced, or the volume of discharge cut by using a smaller aperture in the disc in order to use the gun on a smaller machine it was found that the effectiveness of the gun was greatly reduced, lowering the control of codling moth in one experiment on that portion of the tree between the ground and 12 feet to 3.5% wormy fruit, and to 17.8% on the portion of the tree above 12 feet, compared with even control all over the tree where the standard capacity gun was used.

Deficiencies of the Spray-Gun. This means that only on our largest sprayers can two spray-guns be used. To carry two guns such machines must be running at full capacity and at full efficiency. From personal observation among the fruit growers during the last eight years, I believe that only about 50% of the sprayers used are running efficiently and at full capacity. Leaky pistons, lack of power, engine trouble, etc., all contribute to lower the efficiency of sprayers. Furthermore, many of the machines are far too small to carry two spray guns at the required pressure and volume. On such machines only one gun can be used practically. Is there any saving of time and expense of spraying when only one gun can be used on a machine? Would not two 8 or 10 foot bamboo rods be more economical? Disc nozzles flow from $\frac{3}{4}$ to $1\frac{1}{2}$ gallons per minute. Four of them combined flow between 5 and 7 gallons, and only 200 to 250 pounds pressure is required, well within the limits of most of the duplex pumps.

Furthermore, many complaints have come from growers who have had foliage burned when a gun was used. The spray-gun must be carefully handled to prevent burning. While the grower himself may be careful enough with the spray-gun, the ordinary run of farm help is very careless, and doubtless much damage is due to faulty operation rather than to the nozzle itself. My personal experience at the Alder Run Orchard, led me to abandon the gun in favor of the 10 foot spray rod with disc nozzles, except for the dormant spray, or for spraying when it is windy. Reports from sections of New Jersey, New

York and Pennsylvania indicate that many other growers are having the same experience.

There is a modification of the ordinary spray-gun called the pilot rod, or Master Pilot Rod, which has many advantages. It is mounted on a 4 to 6 foot rod, has an easy action and works smoothly if kept cleaned and oiled after using. It puts the nozzle 6 feet nearer the top of the tree, thus reducing the necessity for opening the gun wide, and using the driving stream.

Dusting. The dusting machines have been coming with great strides during the past few years. We have found the dusts satisfactory for peaches in normal seasons. Experimentally the results on apples have not been so encouraging. However, this past summer on one farm in New Jersey and in three or four in New York state I saw the most beautiful crops of apples grown solely with dust protection. The latest recommendations of the dust manufacturer call for split applications, — that is — dusting from both sides of the tree, applying each time one-half of the material required for the whole tree when it is dusted in one application, and spreading the applications a week apart.

This probably accounts in a large measure for the better results obtained this past year. As has been said of the spray-gun, success with the duster probably depends more on the operator than on the machine.

Substitutes for Self-boiled Lime-sulphur. No one material used in spraying can be said to be entirely satisfactory. Growers are constantly seeking new materials. Three requirements are essential: effectiveness, cheapness, and safety. Because of the burning properties of concentrated lime-sulphur less caustic materials have been constantly sought, especially in the lower altitudes and more humid atmospheres. Self-boiled lime-sulphur was brought out, but the inconvenience attending its manufacture led to further investigation, resulting in the New Jersey Lime-Sulphur-Glue mixture being introduced as a substitute in 1917. This material is a mechanical mixture of the following formula:

8 pounds sulphur, (superfine preferred)
4 pounds hydrated lime
 $1\frac{1}{2}$ ounces ground glue, mixed in 3 gallons of water
Dilute to 50 gallons of water

The sulphur is mixed with the glue water to make it wettable. Excellent results the past five years with this material proved that a good mechanical mixture of sulphur and lime as a wet spray is an effective summer fungicide.

During the past season Prof. Arthur J. Farley, of the New Jersey Agricultural Experiment Station, carried on some experiments with a material in which dry calcium caseinate

was substituted for the glue, to make a dry mixture of sulphur and lime that would mix readily with water. The formula is

8 pounds superfine sulphur
4 pounds hydrated lime
8 ounces calcium caseinate
50 gallons water

Proper amounts of sulphur, lime, and calcium caseinate are weighed out, screened, and thoroughly mixed, dry. It may be then stored indefinitely in bags or barrels in a dry place. Three methods are recommended in diluting this material:

1—Place proper amount of dry-mix in a tight container, add water slowly, stirring until a thin solution is secured. Pour this into the spray tank through a strainer, after the tank is half full of water. This is especially recommended for hand outfits, for then it is not convenient to have the agitator running when the tank is being filled.

2—Wash proper amounts of dry-mix through a 12-14 mesh strainer into tank with a strong stream of water, with agitator running. This is for use when a good water supply is available.

3—Dump proper amounts of dry-mix directly into the tank after it is half full of water, with the agitator running.

Orchard Tests with Dry-Mix Lime-Sulphur. The value and effectiveness of Dry-Mix Sulphur Lime as compared to other mixtures in general use as summer fungicides was tested during the past summer in a number of orchards, including three on peach and three on apple. The peach spraying experiments included comparisons between dry-mix sulphur lime, self-boiled lime-sulphur, Atomic Sulphur, New Jersey sulphur-glue mixture and sulphur lime dusts, together with a study of the effectiveness of Dry-Mix Sulphur Lime mixtures having a relative low content. This discussion will be limited to the results of one experiment conducted in a peach orchard where scab was quite serious. This experiment was conducted in an 8 year old orchard and each treatment included Carman, Lola, Hiley, Belle of Georgia, Elberta and Iron Mountain. Starting with the shuck fall on May 8th, seven applications were made to all varieties except Carman and Lola, which had six. Five spraying treatments and one dusting treatment were made as follows:

Block 1—Atomic Sulphur, 5 pounds to 50 gallons of water.

Block 2—New Jersey Sulphur Glue Mixture.

Block 3—Dry-Mix Sulphur Lime (standard).

Block 4—Dry-Mix Sulphur Lime (special). Sulphur 2 pounds, Lime 4 pounds, Calcium Caseinate 2 ounces. Water to make 50 gallons.

Block 5—Self-Boiled Lime-Sulphur 8-8-50.

Block 6—Check (No summer spray).

Block 7—Niagara 80-10-10 dust mixture in the first two applications, and Niagara 80-20 dust in all later applications.

The average amount of spray material used per tree was 1 gallon, and the average amount of dust per tree was one-half pound. Each block included five rows across the varieties with the exception of the check, which consisted of only one row. The number of disease free, slightly scabby, badly scabby and brown rot affected peaches was recorded based upon the entire crop of fruit picked from at least three and in some cases four trees of each variety in each block. A peach was not considered free from disease unless it was absolutely free from scab and brown rot. The slightly scabby class included fruit with from one to ten small or inconspicuous spots of scab or not enough to lower its market value. All fruit in the badly scabby class had enough scab to lower its market value, and in many cases make it worthless for market. The following table is a summary based upon the results secured with all the varieties.

Treatment	Total Fruits	Per cent Free From Disease	Per cent Slightly Scabby	Per cent Badly Scabby	Per cent Brown Rot
Check	14,738	48.6	34.7	14.8	1.9
Atomic Sulphur	14,155	55.9	28.5	14.3	1.3
Dry-Mix Special, 2-4-50	18,294	69.1	20.3	9.5	1.1
Self-Boiled Lime-Sulphur	16,773	89.5	7.3	2.4	.8
New Jersey Sulphur Glue	12,938	93.4	4.4	1.4	.8
Sulphur Dust	17,145	95.1	3.7	.4	.8
Dry-Mix Standard, 8-4-50	11,927	96.1	2.8	.5	.6

The data in Table I indicate that Dry-Mix Sulphur Lime with an average for all varieties of 96.1% fruit free from disease as compared to 85.5% in the block sprayed with Self-Boiled Lime-Sulphur and 48.6% in the check block is a very effective summer fungicide for peaches. The New Jersey Sulphur Glue mixture with an average of 93.4% clean fruit was also very effective. On the other hand, Atomic Sulphur with only 55.9% and the Dry-Mix Sulphur Lime Special No. 1 with 69.1% fruit free from disease were comparatively ineffective. The exceptionally high percentage of clean fruit secured with Dry-Mix Sulphur Lime and the New Jersey Sulphur Glue mixture in an orchard where scab was very prevalent and during a season that was favorable to its development indicates that both are dependable summer fungicides for peaches and fully as effective as the standard Self-Boiled Lime-Sulphur.

The poor control secured with Atomic Sulphur and the Dry-Mix Sulphur Lime Special both mixtures having a low sulphur content emphasizes the fact that it is not safe to depend upon such mixtures as summer fungicides for peaches, particularly in orchards where fungous diseases such as scab and brown rot are likely to be prevalent. There has been a tendency for several years on the part of manufacturers as well as fruit growers to reduce the sulphur content of summer fungicides in order to lower their cost. That such a practice may result in a heavy reduction of clean fruit is shown in a very striking manner in the results of this experiment. In orchards where scab and brown rot are not serious, very satisfactory control may be obtained with a fungicide having a low sulphur content, but results under such conditions do not determine the real value of a spray mixture and are often misleading.

Results with Sulphur Dusts. Dust, with 95.1% of fruit free from disease, proved to be a very effective fungicide in this experiment, but on the other hand caused very severe defoliation. Over one-third of the leaves dropped from the dusted trees before the middle of August and by September 15th the same trees had lost at least two-thirds of their leaves. The exact cause of this serious defoliation has not been definitely determined, but it was probably due to liberal applications of a dust mixture containing insufficient lime in proportion to the arsenate of lead and sulphur content. The severe injury resulting from the use of dust in this experiment substantiates the conclusions drawn from dusting experiments conducted by the New Jersey Experiment Station in the past to the effect that any dust mixture containing less than 20% of lime is not safe for use on peach foliage.

Experiments with Apples. The apple spraying experiments included comparisons between dry-mix sulphur lime, self-boiled lime sulphur, Atomic Sulphur and summer strength concentrated lime-sulphur. The exact value of dry-mix sulphur lime cannot be determined from the results of these tests, owing to the absence of scab and other serious fungous diseases from all of the orchards in which the experiments were conducted. However, all the data secured, together with observations made during the season indicate that it is just as effective as self-boiled lime-sulphur on apples and much less dangerous to use than summer strength concentrated lime-sulphur. The New Jersey Experiment Station is now recommending Dry-Mix Sulphur Lime to fruit growers in New Jersey as a substitute for self-boiled lime-sulphur as a summer fungicide for all kinds of tree fruits and beginning with the petal fall application it is recommended as a substitute for summer strength concentrated lime-sulphur on apples, except when such diseases as blotch, bitter rot and cedar rust are serious.

Question: Can you buy the Dry-Mix ready mixed?

Mr. Mason: Yes, from different companies; some have put it out under trade names.

Question: Did you begin with the petal fall spray?

Mr. Mason: Yes.

Question: Does Dry-Mix mean the same as soluble lime-sulphur?

Mr. Mason: No. Dry-Mix is a mechanical mixture of sulphur and lime and casein for a summer spray; soluble sulphur is a substitute for ordinary lime-sulphur as a winter spray.

Sheldon Funk: When was the last application on apples?

Mr. Mason: In New Jersey we put on seven applications, the first being the dormant, the second the pink, and the last one normally about the first or second week of August, depending upon when the second brood of codling moth emerged.

Question: How does the cost compare with other mixtures?

Mr. Mason: In New Jersey we feel that the growers can save money by mixing it themselves. You can buy superfine sulphur for \$2.75 per hundred, and hydrated lime for less than one cent a pound; when mixed it will cost a shade less than three cents a pound. Professor Farley says that bulk mixing is sufficient to give good results. It does not require a very fine grinding as for the dust material. By turning it over on the barn floor or stirring it up you will have sufficient mixing. He is strongly in favor of mixing it at home. You can use a barrel cement mixer, but in turning it around you have a lot of sulphur flying around, and that makes it bad to work with.

There are three ways of mixing this material: (1) Where you have a good supply of water in the tank so you can get a good stream into the tank, take a bag of the material and pour in on an ordinary sieve with meshes of ten to fourteen to the inch, and let the water wash the material into the spray tank. (2) Where you have not a strong stream of water, fill your spray tank half full of water, start the agitator running, and then put it in slowly with the agitator running. (3) Where you have a small hand outfit so that you have to agitate by hand, mix the sulphur and calcium caseinate together, then put in the lime and add a little water to make a paste. Powdered arsenate of lead may be added to the Dry-Mix just before using.

Question: Are these experiments covered by bulletins from New Jersey?

Mr. Mason: Yes, the material is in the hands of the printer.

Question: Do you think this superior to self-boiled lime-sulphur in Pennsylvania?

Mr. Mason: As far as peaches are concerned, we feel sure that this material will give just as satisfactory results as self-boiled lime-sulphur and far easier to mix; on apples we believe that it will be an entirely satisfactory substitute for self-boiled lime-sulphur on varieties that spray burn. In most parts of Pennsylvania you can use concentrated lime-sulphur on apples without burning, and there would be no advantage in using Dry-Mix, and it would cost more.

Dr. Fletcher: In Pennsylvania it would seem that this is a material to be used for peaches mainly, also cherries and plums, and those varieties of apples that are liable to spray burn, particularly in the southeastern portion of the state.

GARDEN CULTURE OF BLUEBERRIES

A. F. MASON, New Brunswick, N. J.

In New Jersey we have the largest blueberry plantation in the world. Blueberries and huckleberries both belong to the same family, and the names are used interchangeably. A few years ago Miss Elizabeth White at New Lisbon, N. J., became interested in blueberries. She got in touch with experts who told her how to propagate blueberries. She took bushes from the wild and planted them in rows. From sixty choice plants six were selected showing the qualities that were best. These six were propagated, and they were also crossed



Improved Variety of Blueberry in New Jersey



Five Year Old Blueberry Plantation, New Jersey

with others having desirable fruit characters, and from them she is developing hybrids that are promising.

Now it is possible to grow commercially blueberries from one-half to three-quarter inches in size, on bushes which produce abundantly.

For the past two summers I have made a practice of visiting White's Bog at the blueberry fruiting season to see the intensely interesting results of the selection and breeding work. By the selection of sixty plants producing very large berries in the swamps, which were marked by the "pineys" who pick the wild berries, material was secured for the breeding work. Only six of the original plants were retained as having the qualities desired by Miss Elizabeth C. White and her associates. After watching these fruit for over five years on the testing grounds they are now ready to distribute plants to growers who desire to try them out.

Little is known about the real soil and cultural requirements for blueberries. We find them wild on Pennsylvania mountains, and in flats, in swamps and on well drained hill-sides. The kind used in Jersey are the high bush swamp berries. From the experience of investigators in New Jersey and in Indiana an acid peaty soil, with a well balanced water supply are the prime essentials. Sweet soils will not do. When cultivated they seem to thrive on dryer locations than their wild habitat. Under cultivation they have produced from 2,500 to 4,000 quarts per acre at White's Bog. Ready markets have been found for them at from thirty to sixty cents per quart. The market absorbs the wild berry avidly. If you

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— 20 —



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would see and taste the cultivated berry you would readily appreciate why they find such a sale at such prices. As long as there is a market for a wild berry the cultivated berry will command high prices.

Adams, Sam Harding, Dunfee, Grover and Rubel are a succession of excellent seedling varieties, ripening from July 4th to August 15th, while Pioneer, Cabot and Katharine are varieties of known parentage. My personal taste favored Rubel above all the seedlings, while in the crosses I also like those with Rubel parentage. However, all of the above named varieties are of excellent flavor and quality.

As to possibilities for the commercial culture of blueberries, it might be said that given favorable conditions, the outlook is very bright. However, it must be recognized that little is known of the requirements on any other sorts save those at White's Bog. Individual plants have been found to do well when planted in favorable locations as ornamentals. Reports will soon be available from plants sold the past two or three years, and these should establish fairly definitely the possibility of extensive commercial development under conditions differing from those in our New Jersey savannahs. A few large commercial plantings are developing now in which the practices at White's Bog are being largely followed.

In conclusion I would say that I believe that the cultivated blueberry is well worthy of trial on any acid muck or peaty soil, where a balanced water supply can be maintained, and where climatic conditions are somewhat similar to ours. Also, for anyone interested in breeding and selection, or in horticulture in general, I can promise some very interesting hours if White's Bog is visited in mid-July.

THE JAPANESE BEETLE AS AN ORCHARD PEST

C. H. HADLEY, Riverton, N. J.

United States Department of Agriculture, Bureau of Entomology

The Japanese beetle, (*Popillia japonica* Newm), is an insect native to Japan and was introduced into the United States at Burlington County, New Jersey, probably prior to 1916 and presumably in the grub stage in soil about the roots of certain perennial plants, such as iris and azalea. The exact date of its introduction into this country cannot be determined definitely, but it was not discovered and recognized as an introduced species until 1916, when it was noticed in a nursery within the present infested territory by inspectors of the New Jersey Department of Agriculture during the course of their usual summer inspection of the nursery.

From the time of its first discovery in the United States this insect has increased and spread at a surprising and alarm-

ing rate. At the time when it was first discovered in New Jersey in 1916, the area found to be infested at that time was less than one square mile in extent. At the end of the season of 1922, the insect had spread and increased in numbers to a point where the total infested area, comprising portions of Pennsylvania and New Jersey, included some 773 square miles.

Food Habits of the Beetle

The Japanese beetle is most conspicuous and injurious in the adult stage by reason of its injury to foliage. It is practically omnivorous, feeding on the foliage of weeds of many kinds, small fruits such as grape and blackberry, fruit trees such as apple and sweet cherry, ornamental shrubs, particularly althea and rose, garden flowers of all kinds, field crops such as clover blossoms, soybeans and corn, and shade and timber trees including linden, birch, oak, elm, horse chestnut and willow.

The feeding is characteristic and compares with the eating done by native leaf-chafers. Plants are not defoliated as by certain related beetles, such as the brown May-beetle, but the foliage is skeletonized and when severely eaten the leaves turn brown and drop. In the case of flowers the petals are eaten and the blossoms riddled as by the rose beetle or chafer; in fact, the work of the Japanese beetle in flowers and foliage closely resembles that of the chafer, except that it is usually more severe, many more kinds of plants are attacked, and the feeding extends over a longer period.

The Beetle as an Orchard Pest

That the Japanese beetle will undoubtedly become a pest of considerable importance to orchards seems to be the unescapable conclusion from a consideration of its activities along this line during the past two seasons. Studies carried on at the Japanese beetle laboratory at Riverton, N. J., during the past two seasons, have resulted in the accumulation of a large amount of data bearing upon this point. Without going into details, a few outstanding figures may be cited as indicating the state of affairs at the present time. During the summer of 1921 about 3,200 trees were examined, to determine the amount of injury to leaves and fruit. A summary of the figures thus obtained showed that of approximately 450 apple trees, the leaf injury ranged from 20 per cent to 80 per cent, and that the average percentage of injury was approximately 20 per cent, while of about 1,500 peach trees the average highest percentage of injury in the several orchards under consideration ranged from 75 per cent to 95 per cent, with an average percentage of injury throughout of about 45 per cent. In the case of sweet and sour cherry trees, the average highest

percentage of injury varied from 70 to 95 per cent, with an average percentage of injury of approximately 57 per cent.

During the season of 1922, some 69,000 fruit trees were examined and of these about 50 per cent, or 36,092 showed foliage injury. Of the trees showing foliage injury, the injury ranged from ten per cent to a hundred per cent, with the average being slightly under 50 per cent. It should be noted that the foliage considered as "injured" was eaten to such an extent as to result in the leaves ceasing to function.

During the summer of 1921 the fruit crop was so small that figures representing injury to fruit by the beetles could scarcely be considered as being truly representative. The fruit crop of the summer of 1922, however, was large and injury to the fruit, particularly early apples, was very severe in many orchards in the heavily infested district.

Life History

The total life cycle of this insect is one year, most of which time is spent in the soil as an egg, grub or pupa. Having passed the winter in the soil, $1\frac{1}{2}$ to 12 inches below the surface, the half- to nearly full-grown grub comes up close to the surface in late March or early April and resumes feeding. The older grubs complete their growth by early June, when each prepares an earthen cell, $1\frac{1}{2}$ to 3 inches below the surface, in which it transforms to the pupa and about two weeks later to the adult beetle. Previous to pupating the grub is in the prepupal or dormant stage for a period of a week or ten days, and after transforming to the adult stage it usually remains in the cell another ten days to two weeks before coming out of the ground. Like the related leaf-chafers, this insect pupates within the larval skin, the skin splitting along the back almost the entire length.

The earliest beetles issue the last of June, and the maximum period of emergence is during the latter part of July. The life of the individual beetle varies considerably, averaging from one to ten weeks. Beetles, however, occur over a period of about four months, although they are most abundant during a period of two to two and one-half months.

After issuing, the beetles feed for several days to a week before mating. Mating and egg-laying are continued at irregular intervals, the eggs being laid by preference in uncultivated places such as grass fields or grassy and weedy areas along roadways, in moist but not swampy ground, and in soil containing humus, each female beetle laying an average of from 30 to 60 eggs. The young grubs, which hatch from the eggs some two weeks later, feed on decaying matter in the soil and on living plant roots, and late in the fall they form earthen cells in which they pass the winter.

The beetles are omnivorous, resistant to unfavorable conditions, strong flyers, and very active during warm, clear days. While they may remain above ground on plants during the night, they usually feed only during the day; they are sluggish in cool or damp weather, but exceedingly active on warm, sunshiny days, and fly quickly at the least disturbance, seldom going far into thickets except on the outside foliage. They choose grassy or weedy ground, unshaded by thickets or trees, in which to lay their eggs, and prefer moist loamy soil to dry, sandy soil or swampy areas.

The Insect Described

The Japanese beetle is a beautiful insect about the size of a potato beetle, but more elongated. The head and thorax are shining bronze-green and the elytra or wing covers are brownish, tinged with green at the edges. On the sides and at the tip of the abdomen, usually not concealed by the wing covers, are conspicuous white spots, which distinguish this species from all others of the same size and habits occurring in New Jersey and Pennsylvania.

The eggs are laid separately, but usually several are laid near together in the soil, though not in distinct cells. They are milky white and elliptical oval, measuring about 1-24 by 1-16 inches (1 by 1½ mm.) when first laid, later swelling to nearly spherical.

The grubs vary from tiny individuals recently hatched to nearly one inch when full grown. They are white, with a more or less conspicuous bluish or blackish cast (which is especially prominent at the anal end), and have a tan-colored head. The characteristically curled grubs closely resemble our native white grub of the field, but are smaller than mature grubs of the latter. The pupa, which is the intermediate and dormant stage between the grub and the beetle, is of a pale tan color.

Control of the Japanese Beetle

It may be accepted as a fact that the Japanese beetle can not be exterminated from this country. The area already infested is so large and conditions are so favorable for the well-being of the insect that it is the belief of all acquainted with the situation that extermination is entirely out of the question.

At the present time entirely satisfactory methods for the control of the insect have not as yet been worked out. It is recommended that orchards be given the best possible care, as regards fertilization, pruning and spraying. When infestation by the beetle occurs, even though the usual spray schedule has been followed up to that point, it is quite probable that special applications will be called for in order to prevent or at least substantially reduce injury from the insect. It is there-

fore recommended that as soon as the beetles appear in any numbers in the orchard, a thorough application of arsenate of lead, used at the rate of 4 pounds of the powdered material to 50 gallons of water be made, and in order to insure that enough of the poison will adhere to the foliage to act as an effective repellant to the beetle, it is further recommended that 2 pounds of ordinary flour be added to the 50 gallons of spray material, or some other equally good sticker. Whether or not a later application of arsenate of lead at this strength will be required will depend very largely upon the thoroughness with which the previous application has been made, the number of beetles present, and seasonal conditions of temperature, rainfall, etc.

In the case of early apples, it is recommended that the spray mentioned above be applied, and at picking time, if the apples are badly spotted with the poison, the poison may be removed by having the pickers wear ordinary cotton gloves at the time of picking, with occasional additional wiping of individual apples as required.

It is recognized that in the case of peach trees the above recommendation is not ordinarily safe. At the present time it is not felt that any recommendation can be made for the treatment of peach trees other than the application of such sprays as are commonly required by the usual spray program for peaches, depending upon the locality concerned.

Question: Would cultivation tend to check them?

Mr. Hadley: Summer cultivation to a certain extent will keep out the insect because it upsets the places where eggs would normally be laid, but so far as the actual effect of cultivation, it does not kill them. Very late cultivation in fall occasionally will give some benefit. For example, if you can cultivate after a slight freeze when the grubs are in a semi-dormant condition, then the disturbing of them at that time will kill a great many, but we seldom get the right conditions for this.

Dr. Fletcher: It is your judgment that unless something unforeseen occurs all of the southeastern portion of Pennsylvania may expect to face this problem within the next ten or fifteen years?

Mr. Hadley: I would say within the next four or five years unless something can prevent it which is not now in sight.

Question: Have you any suggestions by which the Federal Government can help us out in this?

Mr. Hadley: The Federal Government is doing practically all of this work now; the States of Pennsylvania and New Jersey are cooperating with the U. S. Department.

There is one point that I did not bring up. There has been published by the State of New Jersey a circular giving the information to date on the Japanese beetle, and anyone who will write for it, I will be glad to send it to. Just drop me a line, addressing me at the Japanese Beetle Laboratory, River-ton, N. J., or simply addressing the Laboratory.

THE JAPANESE BEETLE QUARANTINE — A NATIONAL PROBLEM

J. G. SANDERS, Director

Pennsylvania Bureau of Plant Industry

In the judgment of expert entomologists who have carefully surveyed the Japanese Beetle activities in New Jersey and Pennsylvania, this recently introduced pest is pronounced a most dangerous immigrant. No adequate control is known although all the usual remedies and many new ones have been tried out very carefully by Federal and State experts working in cooperation at the Riverton, N. J., laboratory.

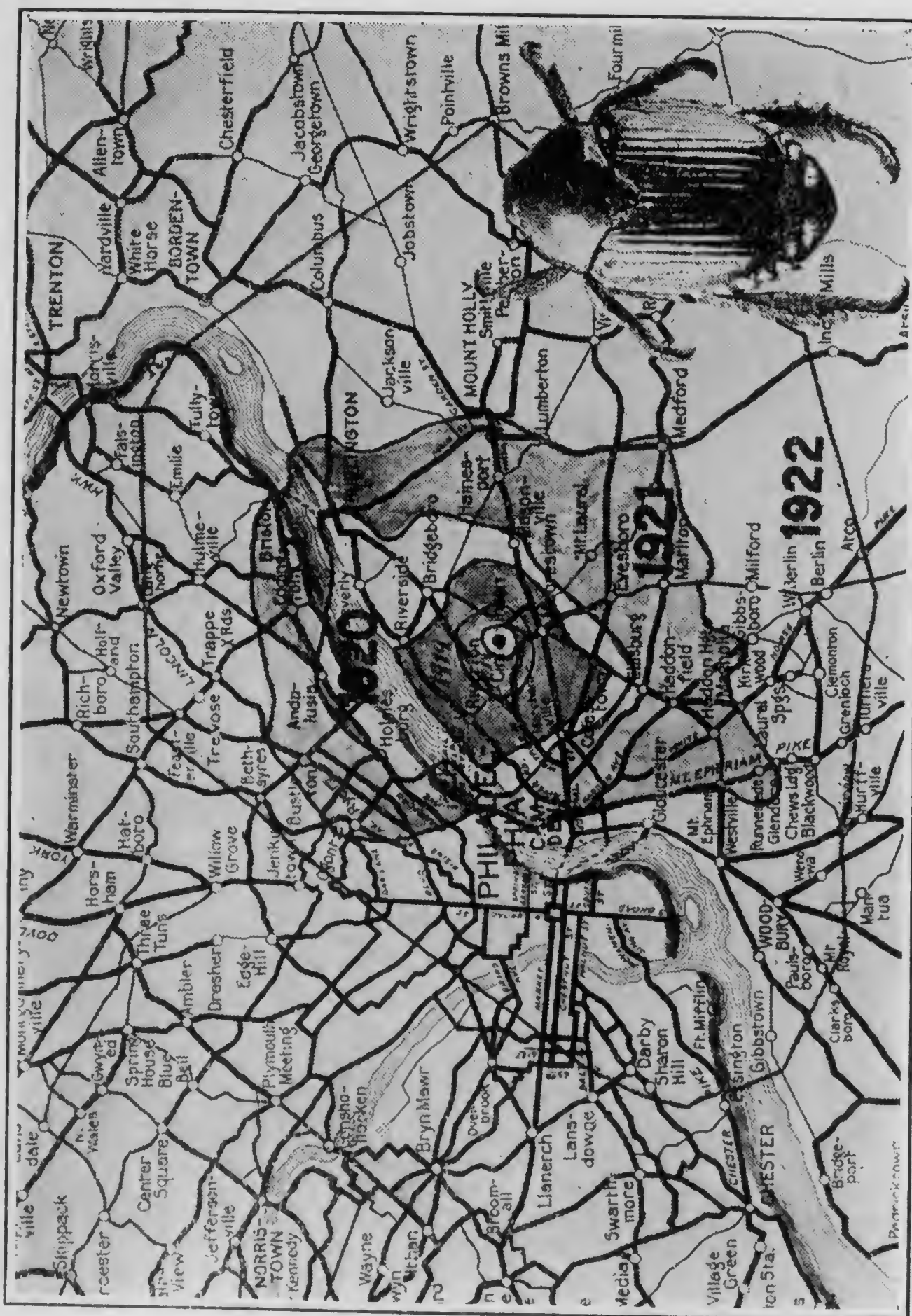
Exceptional damage is caused in apple, peach and cherry orchards by the adult beetle which flies strongly, while the foliage and blossoms of many other trees, shrubs and plants suffer enormously through the voracious feeding of the adults. Arsenate of lead sprays are partial protections only, yet so far have proved most efficacious.

It is apparent that we must depend to a large degree on natural parasites imported from Japan where the beetle is native, and is completely held in check by these natural enemies. Two expert entomologists have been working in Japan for two years, sending over large shipments of several parasites which are cared for and released in the badly infested area.

Protection of outside areas and states beyond the present infested zone, is the great problem of the day for quarantine officers on this job. The natural spread of the beetle by ordinary flight probably will not exceed three to five miles a year, depending on the type of country, whether flat, or hilly with obstructions to advance in the form of built-up areas, which impede natural spread by flight.

Quarantines on movement of nursery stock with soil about the roots in which the grubs can be readily transported, and restrictions on movement of sweet corn and certain fruits and vegetables which may carry beetles during the season of flight from June 20 to September 15, must be maintained to prevent "long jumps" of the pest, thereby starting new centers of infestation to add to our present burdens.

Pennsylvania and New Jersey alone are known to be infested at this time, and are therefore the targets for a "watchful waiting" policy in other states and by the Federal Depart-



THE JAPANESE BEETLE
Map Showing Limit of 1922 Infestation as Determined by Scouting, also Adult Beetle

ment of Agriculture. Unless the infested area is properly policed and outgoing dangerous shipments are under proper inspection and surveillance, there is every probability that many classes of farm and nursery products will be quarantined and these two states cut off from wide markets. Therefore, the Japanese Beetle problem cannot be looked upon as a local matter, but rather must be considered of national importance from several standpoints. This viewpoint is maintained by the Federal authorities, and is the basis for the very liberal support of the Japanese Beetle project during the past six years.

It behooves the states to furnish more adequate support for the quarantine and control work for their own salvation, and for the protection of neighboring states. Although the Government spent upwards of \$100,000.00 last year, Pennsylvania gave but \$10,000.00 for her share in the fight against this noxious and dangerous pest.

Question: Do you mean they would stop trucks going into Pennsylvania from New Jersey?

Prof. Sanders: Within this zone free movement will be allowed, but beyond this specific zone, which is somewhat larger than outlined on the map, we want to prevent shipment of infested material.

Question: You mean ripe fruits? Remember New Jersey sells lots of fruit in Pennsylvania.

Prof. Sanders: Any material that is grown outside of this area and is transported through without stopping, will be allowed to pass but material that is grown within the infested zone must be inspected before being carried out.

Question: Would you consider fruit a carrier of the pest and subject to quarantine?

Prof. Sanders: Most decidedly, certain kinds of fruit under certain conditions.

Question: Apples, for instance?

Prof. Sanders: Yes, early apples.

Question: How serious is the insect in Japan?

Prof. Sanders: In Japan they do not know the insect, it is so thoroughly controlled in that country by its natural enemies.

Question: What is being done to control it through its parasites here?

Prof. Sanders: A great deal. The U. S. Department has two men at present in Japan on this proposition. In fact, one of our own men, Mr. King, is at present engaged in that work, studying and gathering parasites, and has made several ship-

ments of parasites to this country. The Government is pushing this work hard, and is planning to send more men to help those already in the field, but it will take some time before the parasites can gain the upper hand.

WHY WAS APPLE SCAB NOT BETTER CONTROLLED IN 1922

E. L. NIXON, State College

The failure to control apple scab was due to three things and a condition. Discussing the last first, it should be noted that, contrary to what commonly occurs, the period of scab infection began at the first appearance of the leaves and continued until mid-season. Consequently where the intervals between sprayings were too long infection took place. Growing plant tissue that is protected today is not protected ten days from today.

In spraying for the control of this disease the three things involved are, (1) timeliness of application, (2) manner of application, (3) material used. If the question were asked, "Which is the most important?", the answer would be all three.

1st, Timeliness of application — There were still the characteristic number of growers who did not believe that scab would be of sufficient importance to bother about a definite program of control. There were still a larger number who were not quite sold to the absolute necessity of a pink spray in the control of this disease.

2d, Manner of application — With so many fruit growers having this problem to contend with, there are always a goodly number who have inefficient sprayers, inefficient help, too much ground to cover with the available equipment and with whom "it always is a raining". Whether one or all of these handicaps are responsible, the facts are, that even if the material is properly diluted and timely applied, unless the spraying is thoroughly done, the attempt to control scab will fail.

3d, Material used — More failures to control came through improperly diluted material than any other. When so much of the concentrate now on the market is not standard but tests even lower than 1.21 sp. gr., it is unsafe to say "Dilute 1 to 36 or 40". The above criticism does not include the many other hundreds who failed to get control from the use of patent preparations which never had any value in the control of scab. At a time when new and insufficiently tried out materials are rushed on to the market about as rapidly as the publications describing them, it might be well to keep in mind that since Bordeaux Mixture has been a standard of comparison, for these many years; and since lime sulphur has renovated

old orchards and kept new ones clean — a thing that can be said of no other material — it is a poor time to swap horses.

Question: What is the proper dilution?

E. L. Nixon: 1.008 specific gravity, for the diluted spray, ready to use.

I want to impress upon you the extreme importance of getting at this scab problem next year in time and doing a thorough job, and be sure to know something about the dilution of your material. I am not guessing when I say that in many cases it was not done timely or thoroughly or that the material was diluted right. Those conditions I have actually checked up in fifteen or twenty of the most severe cases in the counties of the state.

I know of a number of cases where I could see no reason why they did not get perfect control except that they diluted the material 1 to 30 or 36 when the concentrate did not have sufficient strength to allow that dilution. You can not dilute a low testing concentrate 1 to 30 or 36 and control apple scab no matter how timely you do the work or how thoroughly. I know also, and I can name them, men who omitted the pink spray in this state, but did all other things well. You can not control the scab that way with an epidemic like this one. I know, on the other hand, a great many cases where the work was done as heretofore, that is, they gave a spraying — with or without spray gun — and made only a fifty per cent covering of the foliage. That will not control apple scab with an epidemic like we had, and with a long infection period from the time the leaves came out until the fruit was mature.

I want to sound a word of warning, and I am willing to face you next year on this warning — I predict next year the worst epidemic of apple scab that Pennsylvania has ever seen if the weather is favorable. We have never had such a lot of spores ready to come up. All it will take is moisture during the blossoming period. There are valleys and ravines that have sufficient moisture in the way of fog and dew to cause this. We will have to face the consequences.

A lot of people say "We failed with our material this year, and we must take something new". Do not do it. There is no material that will control apple scab, if properly used, better than commercial lime-sulphur. Continue to use it.

Question: Can the leaves and spores be destroyed by cultivation?

Prof. Nixon: It all helps, but you can cultivate and still have an outbreak of apple scab. The only way to protect your apple trees is to spray them thoroughly at the right time with the right material.

Question: Can you use B. T. S.?

Prof. Nixon: I would stick to commercial lime-sulphur. In some of our experiments we expect to use home-made Bordeaux mixture, which is very good for apple scab during the pink, but there is danger that it will russet the fruit.

Question: Will lime kill scab?

Prof. Nixon: No more than will dirt.

(The paper on "Experiments With Dusting" by S. W. Frost, presented at this point, will be found near the close of this Report.)

DUSTING AND SPRAYING FOR APPLE SCAB CONTROL IN PENNSYLVANIA — 1919 - 1922 INCLUSIVE

R. C. WALTON, Arendtsville

Dusting and spraying for disease control has been conducted in many different orchards in Adams County during the past four years. It is therefore impossible, in the short time allotted to this paper, to give the results in more than one or two orchards for each year. In these orchards the equipment used, such as spraying and dusting machines, was the very best obtainable and therefore it is felt that the results are the best that could be secured with the materials used under Adams County conditions.

In making the applications there were a few points which were deemed of the utmost importance and which were adhered to strictly. They are as follows:

1. Dust and spray applications in any one orchard were, with one or two exceptions, always made on the same day.
2. An attempt was always made to apply the dust when the air was calm in order to insure a perfect covering.
3. Dusting and spraying, especially in 1921 and 1922, were always done from two sides of the trees in order to be absolutely certain as to the thoroughness of the applications.
4. In all of the orchards listed below, high powered spray and dust machines were used thereby insuring good distribution and thoroughness of the applications. In addition, the materials were always heavily applied.

During the past four years many different spray and dust materials have been used in the experiments in Adams County. However, the figures given here are only the results obtained for the control of apple scab by the use of commercial lime-sulphur and the various dust mixtures. There is no doubt but

that apple scab is by far the greatest disease menace to the fruit grower of Pennsylvania and therefore since his chief interest is with this disease, no figures are given for any other fungus pest.

The results on scab control with dust and spray can be summed up very briefly.

In only one year out of the four did dust materials compare favorably with commercial lime-sulphur for the control of apple scab and this was in 1920 when infection was relatively light. The only dust tested that year was a 90-10 sulphur dust and if as good results could always be obtained as were secured in 1920, dusting would be a very satisfactory method of controlling apple scab. However, in the other years, 1919, 1921 and 1922, satisfactory control was not obtained by using 85-15, 75-15-10, 90-10 and copper dusts except occasionally in orchards where scab was negligible. Certainly the results could not be termed satisfactory when the per cent of scab infection ran from 40, as it did under the best of conditions in 1921, to 87% as in 1922.

There is no doubt whatever, as the accompanying tables show, but that the dust materials do greatly reduce the amount of apple scab. This is true not only on the fruit but also on the leaves where it helps to lessen the amount of defoliation.

There is also no doubt but that in the past four years dust materials *did not* consistently give nearly as good results as did commercial lime-sulphur under Adams County conditions. The only times that the writer has ever succeeded in obtaining results with dust that were comparable to those obtained with lime-sulphur were when scab infection was relatively light and therefore easy to control.

At no time since these experiments have been under way, has lime-sulphur failed to give satisfactory control for apple scab *if the applications were made timely and thoroughly.*

A careful examination of the chart for 1922 giving the per cent of marketable apples in plots treated with dust and with lime-sulphur, will give a clear idea of the comparative value of these materials. These results are indicative of those which have always been obtained in Adams County when scab infection was heavy.

It is only fair in defense of dust to say that in one or two other states some very satisfactory results were obtained in 1922 for the control of apple scab.

DUSTING AND SPRAYING FOR THE CONTROL OF APPLE SCAB. FRUIT DATA, 1919 - 1922 INCL.
PER CENT APPLE SCAB

Year	Orchard	Variety	Applications	Lime Sulphur	90-10 Dust	75-15-10 Dust	85-15 Dust	80-10-10 Dust	Copper Dust	Check Plot No Treatment	
1919	Tyson Bros.	York Imperial	Pink Petal fall 10 day 3	4.24			19.8			32.55	
1920	Tyson Bros.	Stayman Winesap	Pink Petal fall 10 day 4 weeks Late July 5	0	.98					32.70	This infection even in the check plots, was classified as "Slight"
	Arthur Griest	Stayman Winesap	Same as above 5	.25	4.08					34.31	
	Tyson Bros.	Stayman Winesap	Same as in 1920 5	14.60	40.40	43.90				95.65	
1921	Minich	Black Twig	Delayed Dormant Others the same as 1920 6	.25	LEAF DATA			22.75	38.83	70.50	LEAF DATA
	Tyson Bros.	Stayman Winesap	Pink Petal fall 2 weeks 5 weeks Late July 5	31.20	86.90					90.91	
1922	Minich	Black Twig	Same as above plus Delayed Dormant 6	15.25	64.22				90.25	100.00	
		York Imperial	Same as above 6	4.95	22.65				23.45	78.75	

**DUSTING AND SPRAYING FOR THE CONTROL OF
APPLE SCAB IN 1922**

		Minich Orchard — Variety — Black Twig				
		PERCENT MARKETABLE APPLES*				
Treatments	Applications	Total per cent Scab	Total Market- able	“Firsts” Market- able	“Seconds” Marketable	“Culls” Due to Scab
Lime Sulphur	Delayed Dormant “Pink” “Petal Fall” “2 weeks” “5 weeks” Late July	15.25	96.55	93.15	3.40	3.45
90-10 Dust		64.22	73.42	59.12	14.30	26.58
Copper Dust		90.25	41.55	25.25	16.30	58.45
No Treat- ment		100.00	9.44	2.21	7.23	90.56

Tyson Orchard — Variety — Stayman Winesap						
Lime Sulphur	“Pink” “Petal Fall” “2 weeks” “5 weeks” Late July	31.20	92.60	88.00	4.60	7.40
90-10 Dust		86.90	70.50	44.60	25.90	29.50
No Treat- ment		90.91	34.09	22.73	11.36	65.91

* No other disease and no insects taken into consideration.

RELATION OF THE SO-CALLED WINTER INJURY AT THE COLLAR OF APPLE TREES TO FIRE-BLIGHT

C. R. ORTON, State College

We have heard in the past much about winter injury at the collar (base of trunk) of apple trees. Bulletins have been published upon this subject by a number of Experiment Stations. Fruit growers in this state have been led to believe that winter injury was the cause of many of the tree losses which they have experienced. Few experimental data have been presented to confirm these assumptions.

On the other hand Plant Pathologists of the Pennsylvania Experiment Station have been able to show conclusively that fire-blight is commonly the cause of severe collar injury and death of trees and it therefore seems pertinent to raise the question whether winter injury at the collar is an important factor in Pennsylvania.

During the past ten years I have been in many of the orchards of Pennsylvania where injury of this sort is present. Professor E. L. Nixon has been carefully observing these reported injuries for the past five years. During these observations we have not seen an authenticated case of winter injury at the collar. Most of these cases when investigated turn out to be fire-blight, though in some cases perhaps fungous parasites are concerned. The rapid secondary invasion of the blighted areas by wood decaying fungi make it practically impossible to determine the primary nature of the injury after the trees have died. The blight organism can usually be isolated from the living root terminals prior to the death of these roots. It is usually much more difficult to isolate the blight bacillus from the bark of the trunk surrounding the cankers.

The only true cases of winter injury which we have observed upon apple trees in Pennsylvania were found around the bases of the main limbs of the tree and on the terminals. At the crotches the injury is often severe and it may extend upward on the branches. Untimely pruning, grafting, fertilization and cultivation appear to be the usual predisposing causes for such injury.

We are forced to conclude that winter injury at the collar is of rare occurrence in Pennsylvania; that most of these reported cases are primarily fire-blight followed by fungous rots, and that true winter injury most commonly occurs at the crown and on the terminals.

FIGHTING APPLE BLOTCH

C. R. ORTON, State College

Apple Blotch is increasing in Pennsylvania. Slowly but surely it is getting a foothold throughout the State. At first it was thought that this disease, which is most serious in the southern Mississippi Valley and extending into the Missouri and Ohio River Valleys, would not likely prove to be a serious disease as far north as Pennsylvania, but experience has taught us that wherever it has been introduced into this state it has persisted and spread. At the present time it is known to occur in practically every county in Pennsylvania.

We believe the disease in every case has been brought in on nursery stock purchased from nurseries within the original range of the disease as mentioned above. This has not only happened in the past but is even going on at the present time. Just this winter we had occasion to examine trees purchased by a Pennsylvania grower which were 100 per cent diseased with blotch. Orchardists will do well, therefore, to give this matter careful consideration when they are purchasing new stocks.

The twigs of the following varieties have been observed to be susceptible in Pennsylvania. Ben Davis, Early Harvest, Ewalt, Grimes Golden (slightly), Hawthornden, Krauser, Maiden Blush, Newtown Pippin, Northwestern Greening, Red Astrachan, Rome Beauty, Smith Cider, Stark, Summer Rambo, Winter Banana, Yellow Transparent and York Imperial (slightly). The fruit may react quite differently from the bark as regards susceptibility but inasmuch as the fungus causing blotch appears to live over winter wholly upon the bark this phase seems to be the most important.

In controlling this disease where it is well established two distinct operations are essential. In the first place a judicious pruning of the twigs to remove the cankers (rough bark) is very helpful in reducing the extent of the source of infection. This may be done at the time of the regular pruning. In the second place spraying must be followed out carefully and consistently. Mr. Walton, working in Adams County, this past year has found that the old recommendations for applying the first blotch spray are inadequate. Instead of applying this spray three weeks after the petals fall it should be applied 10 days after the petals fall and thus fall in line with the last scab spray. The application should be followed by two later ones at about two week intervals and if the initial application is timely no difficulty should be encountered in securing protection.

Bordeaux mixture 6-8-100 should be substituted for lime-sulphur 1.008 sp. gr. for all blotch applications.

PROGRESS IN METHODS OF CONTROLLING APPLE RED BUG AND APHIS

H. E. HODGKISS, State College

As far as Aphis is concerned the situation remains where it was some ten years ago. Some fruit growers say that the application of nicotine sulphate will not control Aphis, but nobody as yet has brought forth a better method.

The most efficient method which we have for control of the Rosy Aphis is spraying just as the buds burst. Delayed dormant spraying must be made so that the spray is forced into the trees and reaches the ends of those buds. We can not spray down; we must spray at the buds, and we must aim to cover every bud on the tree. It is quite a hard job, but it can be done, and fruit growers are beginning to see that it can be done, and the number of men who are making a success of Aphis control through this practice is getting larger every day.

We have heard of control of plant lice through applications of nicotine dust. Experiments indicate that there is not as much efficiency in the application of dust for apple aphids as for aphids of other plants, such as truck crops, or for other sucking insects, such as Red Bug. We must continue these experiments for some years before it will be advantageous for the fruit growers to use nicotine dust on fruit trees for aphids.

As to the Red Bug, you can control it with nicotine dust application. You can also control it with liquid, together with better control of scab. I know from experience that you can not control scab with dust applications, and you may not get efficient control of insects. I admit that it is possible to control sucking and chewing insects by applications of arsenical dust and nicotine contact dust, but the efficiency depends on the amounts of materials that you put on. For the present we recommend that you use the liquid for these various purposes.

It is doubtful if radical changes in insect control practices should be adopted generally, although in special instances the added cost of special machinery and materials may aid in orchard operations where insect control alone is to be considered. The type of contact dust most suitable to use is being determined by different experimentalists. Until these materials become standardized for use in the orchard the fruit grower depending on a comparatively small acreage should keep a live interest in the work that is being done but not try costly experiments at his own expense.

Question: I would like to ask if there is not quite a field for dust on late sprays to avoid stains on the fruit?

S. W. Frost: Our experiments during the past summer only have shown that the late application of arsenate of lead with a fungicide has been doing excellent work in controlling leaf roller. I should say, yes, that the dust application for that advantage is satisfactory.

Question: Was nicotine sulphate or free nicotine used? What was the carrier?

Prof. Frost: Lime was the carrier, and nicotine sulphate was used.

Question: What results have you gotten from dusting for Rosy Aphis?

Prof. Hodgkiss: We have not had as good control as with liquid, which seems rather strange in contrast to the results from Red Bug.

MY EXPERIENCE WITH DUSTING

F. H. FASSETT, Meshoppen

I have been listening to the reports on these insects and diseases by the different gentlemen, pests that seem so prevalent in the southeastern part of Pennsylvania and in New Jersey. I begin to think that I must live in God's Country, because we do not have cause to complain of the results of dusting. In our orchards we have sprayed for a great many years, and we have never had a serious outbreak of scab, and never any red bug practically, and so dust has seemed to control insects and diseases for us. In the season of 1921, in order to make an experiment, we sprayed one-half the orchard with concentrated lime-sulphur solution and arsenate, and the other half we dusted with 90-10 dust, at the time of the calyx spray. I must say that the dust worked better than the spray. All during that season the foliage on that dusted portion was darker color and the trees and fruit looked better all through. In our case, where we do not have all these insects and diseases, it does work well.

We have been getting somewhat nearer in the last two years to some of the conditions that have been described in the southeastern part of Pennsylvania. Last season particularly there came into our orchard a great deal of disease different from any we usually had. On the blossom end of our apples, some injury from insect or otherwise, caused it to commence to turn green, and after the apple was picked and stored it again turned red. We do not know what it is, and we are at a loss as to how to control it, and we are anxious to know about it.

I believe in cultivation. I believe clean cultivation in an orchard is going a good long way toward solving some spray problems.

Question: Do you dust morning, evening, or the middle of the day?

Mr. Fassett: Usually in the morning. One morning my son and I started at about 4:30, and by 8 o'clock we had dusted what usually took us three days to spray.

Question: Do you have apple scab, and does dusting control it?

Mr. Fassett: We have very little scab.

Question: If you had apple scab would you dust?

Mr. Fassett: We would try it.

Question: Do you have scab on untreated trees in your county?

Mr. Fassett: Not much. I am a firm believer in dusting, and I believe all you fellows will be dusting in five years.

Member: The injury on the end of the apple you spoke of a little while ago may be due to frost injury.

Question: Did you say that dusting controls later fungus diseases such as Flyspeck fungus?

Mr. Fassett: That has not been very prevalent.

Question: Have you used copper dust?

Mr. Fassett: No.

Member: I think that dusting should not be passed over so hastily, especially on a big place. We ourselves think spraying is better, but we can not get around so well, and we can not get men to work for three or four dollars a day on a spray machine. Therefore, we must use dust, hoping that it will do the work. I want to ask Professor Nixon if it is not better for those people who were hit so hard with scab this year, when they can maintain enough dusters, and can not maintain enough sprayers, to keep on dusting and dust as thoroughly as we can, if we can not do thorough spraying?

Prof. Nixon: In your case dust if you must, but if you can spray, spray. If you can not possibly get enough men to spray, then dust; but remember it is second fiddle, and I dare say that we will see orchards in Pennsylvania that have been dusted and the crop ruined. I would rather take twenty-five acres and look after that and raise good fruit next year, than to go over the whole business in an unsatisfactory way and ruin it.

Question: I would like to ask Mr. Fassett if his orchard is near a large stream where there are fogs and a lot of moisture?

Mr. Fassett: I am located along the Susquehanna River, and we get very heavy fogs.

Member: That accounts for your success with dusting I think.

Question: Are these makes of lime sulphur and arsenate of lead equally good: General Chemical Company, Vreeland Chemical Company, Rex Spray Company, and Sherwin-Williams Company?

H. E. Hodgkiss: Yes. These are all standard and reliable products.

Question: Are miscible oil emulsions as valuable as lime-sulphur to control scale?

H. E. Hodgkiss: Owing to its spreading qualities miscible oil is perhaps slightly more efficient. In general orchard operations lime-sulphur solution is preferred by most orchardists on account of its added fungicidal properties and comparative safeness in the hands of inexperienced help. It is efficient for scale control and can be used in combination with other insecticides which effects a saving in costs of application.

WHAT IS THE BEST WAY TO REMOVE SPRAY STAINS FROM APPLES

F. N. FAGAN, State College

After we get the spreaders and stickers perfected, are we going to carry more spray material on the fruit into the barrel or box, and thus into the market? If so, we are liable to get into trouble with the boards of health for arsenic spray stains, which they may claim will injure health. There is not an apple buyer anywhere who would not rather buy sprayed fruit, and he does not care if the spray is there or not, but he does not want it to be too apparent. I do not believe anyone would run any chance from arsenic poisoning from eating fruit with spray stains. They would die from the effects of over-eating before they got enough arsenic to hurt them. But if we keep on using the arsenic it will be found on the fruit and occasionally objection to it may be raised. How to get this off the fruit? Some use automatic brushes for the fruit, or brushing machines. In the Northwest some growers use cotton or canvas gloves for packers, and as the fruit is handled they brush off a great deal of the stain. A man in New York has equipped his sizing machine with some cotton pad brushes, giving fairly good results. He even puts on an antiseptic wash, which helps to remove the stain. It may help the keeping quality too.

EXPERIENCE WITH STICKERS AND SPREADERS

F. N. FAGAN, State College

Almost from the beginning of spraying, spreaders and stickers of some kind have been used. Most of them have been weighed and found wanting. We had resin-soap sticker and

many others. In recent years the casein spreader has come and from experimental evidence that we have had throughout the country, especially in the Northwest, it looks as though it had come to stay. I am inclined to believe that there are many growers here who believe in it thoroughly. From what we have done at the College with "Kayso" which came out first, and has been pushed the hardest of the various casein spreaders, we like it. It is best not to mix it with hot water, and not to drop it into the tank without mixing it to a paste. The milk spreader was used twenty years ago. Now it is brought out in just a little different form. Of course it is the casein in it that we want.

Question: Have you had any experience with the use of skim milk?

Prof. Fagan: Not recently. It has been used in the past, but it was given up as not successful. I think the man who started the first casein work, in Oregon, did use skim milk, and then resorted to the manufactured casein.

Question: Does the spreader injure the fruit in any way?

Prof. Frost: No. In our experiments the plot with the spreader showed the same amount of injury from insects and diseases as without. The condition of the foliage was improved.

Question: Can you secure any greater protection from scab by the use of spreader?

Prof. Fagan: I have not.

Prof. Nixon: I have not observed any difference. It works well, but we see no difference in control. If you do a good job you get control, and if you do not do a good job, you do not get control. The spreader has nothing to do with it.

Prof. Hodgkiss: Spreaders work well and are useful, but I am wondering if owing to the psychology of the word "spreader" we are not getting away from the real situation. In order to control insects we must put the spray where the insects are. We must do that under high pressure, and use the right material. The men who are getting practically 100 per cent control without the use of spreaders, have trained themselves to do a thorough job; some men who are not getting 100 per cent control want the spreaders to help them out, because they are inefficient in their work. I am just wondering if the use of spreaders will not encourage the efficient man to let down on his work, thinking that perhaps the spreader will do the job and require less work. That is what I am afraid of.

Question: Does the addition of the sticker make the material run any better?

Prof. Fagan: It seems to run better.

Prof. A. F. Mason: In New Jersey we have had considerable experimental and practical work with spreaders. In one experiment at Glasgow, where there was a very serious outbreak of codling moth, it was necessary to use fifteen applications of eight gallons per tree, and even then there was 32 per cent of codling moth injury. This last season they were able to control codling moth with the casein spreader and regular material, with seven sprays, and they had 4 per cent codling moth injury. Doctor Headlee is pleased with the results of the casein spreader, but he does not believe that you can take the word of the casein people, and use only 1½ pounds of spreader to 100 gallons of spray; he believes you should use 3 pounds to 100 gallons.

IS THERE ANY SATISFACTORY SUBSTITUTE FOR THE HIGH-PRICED NICOTINE SULPHATE?

T. L. GUYTON, Pennsylvania Bureau of Plant Industry

At present there are no cheaper substitutes for nicotine sulphate which may be recommended without reservations.

Recently, in New York experiments, reground tobacco dust used at the rate of 40 pounds to 100 gallons of 1-40 lime-sulphur gave very favorable results in the control of red bugs and aphids. This work is still in an experimental stage. The tobacco dust was purchased on the market and reground at the Experiment Station to a fineness to pass through a 200 mesh sieve. The cost will run about 1½ cents per pound for the reground material at Harrisburg. Should this dust be found entirely satisfactory a saving of about 40 cents per 100 gallons would result from its use.

Nicotine oleate has been used for a few years rather successfully in the control of white fly, soft scales and aphids in greenhouses. This material has some promise in orchard spraying but no trials have been made up to this time. Nicotine oleate is prepared by mixing one of the free nicotine compounds containing 40% nicotine with oleic acid or "red oil", at the rate of 10 volumes of the former with 7 volumes of the latter. A gallon of the resulting soap like mixture is used to each 650 gallons of spray. Little is known of the behavior of this material when combined with other spray material, and the cost is about one-half that of nicotine sulphate.

Quassia chips (a product of a plant native of Jamaica) has some promise as an insecticide for aphids and red bugs, but is probably too slow in action to be of much value in orchard spraying. At present the cost would be considerably higher than nicotine sulphate.

Kerosene emulsion has been substituted for nicotine sulphate in control of aphids. Doctor Britton, Entomologist of Connecticut, found with the high prices of nicotine in 1919,

that it was economical to prepare this emulsion for the control of pink and green potato aphid. His recommendation for the preparation of the emulsion is as follows:

Kerosene	-	-	-	3 gallons
Soap (about 40 ounces)	-	-	-	4 cakes
Water to make	-	-	-	50 gallons

The material should be churned or pumped violently until milky white. While this emulsion is quite satisfactory in the control of the aphids, skill is required in its preparation to eliminate the free oil, which is dangerous to plants.

Many workers have tried different strengths of soap solutions for control of sucking insects, but with only partial success, and with foliage injury resulting in many cases.

Question: Is the nicotine dust sold by manufacturers fine enough?

Mr. Guyton: Usually not. Professor Parrot stated that it was necessary to regrind it to 200 mesh fineness. Some spray manufacturers may be putting it out that fine.

Question: In making tobacco decoction on the farm, from stems or waste, should it be boiled a long time?

Mr. Guyton: In preparing tobacco extract you never should boil it. It should be soaked in cold water for 24 hours.

WHAT IS NEW IN PEACH YELLOWS?

W. A. McCUBBIN, Pennsylvania Bureau of Plant Industry

The outstanding point in the Yellows inspection of 1922 is a notable reduction of the disease. It was expected that since there was little fruit in 1921, many trees would be passed over that year for lack of fruit symptoms, and would thus come to swell the 1922 count. In spite of this, however, there is a gratifying drop in the percentage, from 4.5 in 1921 to 2.5 in 1922.

A very important piece of news for peach growers concerns the progress that has been made recently in clearing up the cause of diseases of the same type as Yellows. When asked at former meetings and by countless growers why the scientists are not studying Yellows, I have replied that they die trying to solve this type of disease by studying similar troubles on more easily handled plants, like tomato, tobacco, etc. I also suggested that perhaps the finding of the cause would mean little change in our method of Yellows control. This indirect method of solution now promises to be amply justified.

At the meetings of the American Phytopathological Society in Boston, in Christmas week, three separate papers announced the finding of organisms in these baffling diseases in various plants, among which are bean and tomato mosaic and

potato leaf roll. It has been determined that these organisms are neither bacteria nor fungi, but belong to those low forms of animal life called Protozoa, to which belong the organisms causing malaria and sleeping sickness. This discovery leads us to renewed hope that we will shortly find out the cause of the Yellows and Little Peach diseases, and while a knowledge of the exact cause may not affect our present methods of dealing with Yellows by a prompt eradication, yet that knowledge may be of distinct value in enabling us to take measures to prevent its spread.

The proposed State budget cuts are likely to affect our Peach Yellows Campaign, since we will not be able to employ the necessary force of inspectors. I would therefore urge this Association to use its influence in helping to assure adequate support for this valuable service to the peach industry of the State.

(See Resolution adopted at the Business Session later.)

SPRAYING RINGS

J. J. JAQUISH, Tunkhannock

One of our problems in Wyoming County is the farm orchard; "Every day, in every way, they are getting worse and worse".

Our orchard spray rings are similar to the potato spray rings. Many of the owners of the small farm orchards, of from one to four acres, know they ought to go at the job, but they won't do it. It is coming to this, they will either have to go to the commercial orchards and buy fruit, or begin spraying. Our object is to give the man who has one tree or ten trees the help he needs. We give him the use of a big machine, of 300 pounds pressure with two spray guns. We have five machines and we had forty-seven men with four thousand young and old trees. They yielded 23,000 bushels, of which 14,000 bushels sold at 70 cents and brought \$9,800. The material cost \$1,500 or approximately 30 cents a tree.

Next year we will have ten rings, and after that more. In Wyoming County you can find farm after farm with a neglected small orchard; but we hope to change that condition. It is difficult for the small grower to follow the spray schedule, but if he can hire a man to do it, that is the best way.

Member: What number of men do you consider right for a ring?

Mr. Jaquish: We have one association with fifteen, one with four. It depends on conditions.

Member: How about the cost per tree?

Mr. Jaquish: We buy the machine on the equal share basis, whether you have ten trees or one hundred trees.

Member: What machine do you use?

Mr. Jaquish: The Field Force, a four-horse power machine, also the Junior Leader. But others are just as good.

President Fletcher announced the appointment of the following committees:

Resolution Committee — P. S. Fenstermacher, Chairman, A. Sheldon Funk, R. J. Gillan.

Nominations Committee — C. J. Tyson, Chairman, F. H. Fassett, R. J. Walton.

Auditing Committee — S. R. Huey, Chairman, W. O. Bingham, W. J. Lewis.

WEDNESDAY AFTERNOON, JANUARY 24, 1923

**COOPERATIVE MARKETING OF FRUIT IN
PENNSYLVANIA**

MANLEY STOCKTON, Biglerville

The Biglerville Cooperative Packing Association with which I am connected, is the pioneer in the east. The first Central Packing House in New York was in 1918, while the Adams County Association was established and operating in 1915. I wish to preface my remarks with a general caution to all those contemplating the establishment of community packing houses. This is not a cure-all for careless or disgruntled growers, but if carefully handled will work out to great advantage to those connected with it. We are incorporated under the laws of Pennsylvania, and we find that form of organization of advantage to us in matters of finance and business.

In our section, prior to 1915, the cash buyer was the principal outlet for fruit and he bought either at so much a barrel picked in orchard, or a lump sum. The late D. N. Minnich saw a field for an association of a number of growers, and in 1915 initiated the work. For three years we have been packing and marketing our fruit through our office at Biglerville, without employing outside agencies. We have had, cooperatively, a more successful year than any since we assumed our own marketing problems.

A great deal depends upon the kind of pack you are able to make and can standardize. We believe in private brands. We do not mean by this to depart from the grading regulations that are adopted generally, but we do feel that no small

part of our success is due to the effort we put into private brands. There is always a demand for such a brand if you can establish the fact that it is one of merit.

Closely coupled with all of our endeavor we find cold storage is necessary. We do not depend entirely on cold storage, but we have cold storage adjacent to the packing house, and it enters in more and more. It has been the only means whereby we got increased returns this year over what we could have gotten early in the season. I am going briefly to give the method and procedure of our marketing here, thinking that that might be the thing of most vital interest.

Marketing Methods. The first thing, in the early fall, is to make an estimate of the crops of our members and find out as nearly as possible how many growers will depend on us as their market channel. While it is not always possible when you first make the estimate, to know how many growers or acres will be included, nevertheless it is important to find this out early, and we estimate the number of barrels of each variety as early as possible. We then follow up the various barometers of the apple market as closely as possible, and make quotations before picking, if we feel that we are safe in doing so. We make quotations subject to change, because hail storms and wind storms may intervene, and that is something against which protection is very essential.

We then plan on securing a certain percentage of our crop for movement in the fall. When we have sold up to that amount we stop selling and wait until the season is well started, and we are sure whether we are in line with quotations and market demands. We usually hold a part of the fruit. This year we held more than usual. There are, of course, variations to the program. We use cash sales, F.O.B. tract, and cash sales delivered from storage.

This question might arise, in a small organization like ours which does not handle much volume, "can we reach all the markets, and are we on as good basis to distribute and sell as some of the larger organizations which are represented in practically all the markets in the country?" We feel that in our case success is not due to our small size, nor is the fact that we are small an indication that we will be a failure; but the fact that the effort is back of the pack has enabled us to build up a trade. We do have access to all the markets, and we feel that we are not handicapped by being our own sales agents.

We pack fruit and pool it according to variety and grade. Regardless of the man's crop we pool it on a basis of equal quality and we have certain grades that we have adhered to for a number of years. We find it very essential, in order to be just, to have a strict line drawn as to grade.

Advantages of Cooperation. Our evidences of success are in the few losses which we have experienced. We have a number of letters from the trade in general that we are vain about, whereby we have demonstrated the ability to sell at a premium on a low market on account of the brand being known.

We accumulate a volume of fruit and enable the fruit grower who has less than a carload to have the benefits of shipment on carload basis. We relieve the grower of the packing and marketing problem when he is busy with his harvesting, which requires his personal attention. We are able to establish facilities for standardization which the individual can not establish for himself, unless he has a great volume. No cooperative marketing association can succeed unless it has the faith and confidence of the growers. Unless you can obtain the confidence of the community where you operate, you will have an uphill business. The cooperative association stands on its own merit. When we first started out it was apparent that the personal interest of one man or another helped hold it together; now we are convinced that it stands on its own legs, through the experience of the past eight years.

I once read an article by G. Harold Powell, of the California Fruit Exchange, in which he said that the history of cooperative marketing of fruits in the United States was strewn with wrecks of cooperative organizations, and unless the growers go into it anticipating a great many difficulties, and armed against such difficulties, they will find that it will not relieve nor limit troubles unless you guard against weakness in organization from many sources.

Question: How far do you haul the fruit from the orchards?

Mr. Stockton: We have hauled twelve miles, but the majority comes from orchards two to four miles.

Question: What would be the limit?

Mr. Stockton: That would depend on the roads and on the package in which the fruit is hauled and the equipment or truck used. Certainly the shorter the haul the better it will be.

Question: What is the best source of information for markets?

Mr. Stockton: You will find it very important to rely on experienced market men to give you the information you want. At the same time maintain your own brands, and see that your continued efforts are building up something for you. I do not want to go on record as saying that there is any hazard in affiliation with a national marketing agency. Of course, in many cases, it is the best method.

COMBINED MEETING AND FRUIT SHOW AT WASHINGTON, D. C.

President Fletcher here gave freedom of the floor to Mr. Russel Bargamin, of Crozet, Virginia, a representative of the Virginia State Horticultural Association.

Mr. Bargamin: I have been delegated by the Virginia State Horticultural Society to confer with the Societies of Pennsylvania, Maryland, West Virginia, Delaware and New Jersey, as to the matter of holding next winter an Apple Show at Washington, and a joint meeting of the societies at the same place. The Virginia Society realized that for twenty-seven years we have been meeting in the towns and cities of Virginia, that Mr. A has been showing his apples to Mr. B, and Mr. B to Mr. C, and we are not getting anywhere as far as advertising or publicity goes. A move was started to see if the Eastern States, the barrel producing states, of which Pennsylvania is an important one, could not put on an Exhibition along the lines of the one which this year was held at Council Bluffs, Iowa, or such as the National Apple Show held every year at Spokane, Washington. The Virginia Society adopted a resolution to meet in Washington, D. C., and ask other states to join us. At its meeting, two weeks ago, the Maryland Society unanimously passed a resolution to join us. I bring the same message to Pennsylvania.

We feel that the Eastern States, the barrel states, ought to have as much publicity as the West has. We determined upon Washington because it is the Capitol, and because it is a neutral point. Virginia could not claim any advantage, and no other state could. We will have the benefit of experts in the U. S. Department of Agriculture. We also feel that with Congress in session, we would secure more advertising and publicity throughout the country than any other city in the East. Of course, the same might be said of New York, but certainly Washington would have an advantage over Baltimore, Richmond, or possibly Philadelphia, because it is the Capitol.

We have made no effort to make detailed arrangements. Our own State Committee feels that we should await the appointment of other committees, and then work out a common program. Maryland has appointed its committee, Virginia has appointed hers. We ask Pennsylvania to adopt resolutions and appoint her committee. We feel that the burden of expense should fall upon the sale of advertising space and floor space, and the horticultural supply houses are all keen for it, because they realize that if they can cover their work by going to one Show, and take care of six states, it enables them to put more money into one place and secure greater returns than from any individual show.

I hope that the Pennsylvania Society will act on the matter as the other states have.

Mr. Fenstermacher: Would you mean by such a move the abandoning of our Annual State Show in Harrisburg?

Answer: That would be left for the individual states to decide. I do not feel that a state could put on an Apple Show there without having its educational and business meeting there also. We feel that if we are going to act we should act jointly. There is no use in Virginia putting on a Show there and exploiting its barrel apples unless all the states do.

Dr. Fletcher: Is it the pleasure of the meeting to consider this now, or shall we refer this subject to the Business Meeting tomorrow morning?

H. C. Brinton: It seems to me that this is a big proposition to consider. All the eastern states have been in the same boat for a long while. We have been paddling around in a circle. I believe we should look into this. I think it would be well to defer action on it until tomorrow.

Howard Chase: I present the motion that the question be referred to the business meeting tomorrow.

The motion was duly seconded and passed.

A COMMISSION MAN'S VIEW OF PRESENT GRADING PRACTICES

W. H. BAGGS, Pittsburgh

The National Law covering apples provides for but one grade, divided into three sizes. The Pennsylvania law follows very closely the National law, requiring apples of the same variety, and specifying minimum size. West Virginia and New York State not only grade as to size, but also as to color requirements, and the United States Department of Agriculture is proposing grades based on color and size.

In addition to apples we have National laws covering the grading of onions, potatoes, sweet potatoes and strawberries; and State laws including the aforementioned commodities. In fact the grade of most fresh fruits and vegetables is covered by laws, especially in states where there is a large commercial production of any particular commodity. Most of these laws have been passed only after thorough investigation on the part of the United States Department of Agriculture and the various State Departments of Agriculture, in conjunction with growers and shippers, as well as handlers of these commodities in the various large markets.

Speaking as distributors of our own products, and the large number of growers whom we represent, will state that as a whole the present grading practices are satisfactory and

amply meet our requirements. As a matter of fact we are now much more concerned about the condition and packing than we are about the grading.

We might offer this criticism for the good of the trade as a whole, which includes the grower, as well as the distributor and consumer; i. e., that there is a tendency on the part of the grower or shipper simply to come up to the standard of grading required, whereas the pronounced successful handlers of fresh fruits and vegetables have been those who aim to do a little better than the law requires.

Another point of criticism might be directed to failure on the part of both grower and distributor to grade closer where similar conditions exist as those prevailing in the white potato industry at the present time; the present commercial grading permitting the shipment of decayed stock not to exceed 2%. While Pennsylvania grown potatoes are commanding a premium in the markets, yet present conditions do not justify the shipment of other than perfectly sound potatoes in every respect.

ARE THE MIDDLEMEN GETTING TOO LARGE A SHARE OF THE FRUIT GROWERS' DOLLAR?

W. H. BAGGS, Pittsburgh

This subject has been agitating the minds of not only the grower, but the consumer, not only in this generation, but ever since it has been necessary to employ an intermediary in order to have the products of the farm delivered and consumed at points outside of their own immediate neighborhood. The matter became so acute in 1921 that our national government appointed a Joint Commission of Agricultural Inquiry, Mr. Sidney Anderson of Minnesota as Chairman, which resulted in what was probably the most exhaustive investigation of business in all its relations ever carried out in this country.

Report of Agricultural Commission. The Commission divided its report into four different parts; Marketing and Distribution being included in Part 4. Chapter 3 covers the results of this investigation as it pertains to the marketing and distribution of fresh fruits and vegetables, from which for your information I desire to quote the following paragraph:

"In studying the distribution of fresh fruits and vegetables we must first consider the wide areas over which these commodities are produced and distributed. People in cities now draw their major supplies of these commodities from distant points. Areas of production may be hundreds and even thousands of miles from areas of distribution. There has been a very noticeable tendency toward the concentration of fruit and vegetable

acreage in certain specialized restricted districts. In other words, fruit and vegetable growing has become a specialized business. The development by irrigation of many fertile valleys and districts in the far west and increased production in Southern States account for much of the growth of the industry. The prevailing movement of these commodities is from the West to the East and from the South to the North."

The report also contains a summary of 9,476 cars of representative fruit and vegetables sold at wholesale prices in the cities of Boston, Chicago, New York, Philadelphia, Pittsburgh and other cities during the period September, 1920, and July, 1921. The commodities included thereunder consist of the following:

Approximately 2,000 cars barreled apples
1,500 cars boxed apples
1,000 cars northern onions
200 cars Florida citrus
430 cars California cantaloupes

a fairly representative number of cars of practically all lines of fresh fruits and vegetables, including around 700 cars of potatoes; the total sales of which represented over \$10,500,000; out of which

Transportation received	32 - 79/100%
Shipper received	59 - 64/100%
Miscellaneous handling costs	4 - 39/100%
Receiving Distributors' Gross Profits	3 - 54/100%

out of which the Receiver must of necessity pay his operating expenses. The Receiving Distributors' gross profit on

Barreled Apples was	2 - 3/100%
Boxed Apples	2 - 14/100%
Northern Cabbage	1 - 76/100%
Northern Potatoes	1 - 28/100%

I am firmly convinced had this investigation been made during the year 1922, it would have shown that the Receiving Distributor received less out of the gross profits during 1922 than 1921.

I wish to call your attention to this source of information available for everyone, which makes it unnecessary for unwarranted attacks in the future upon the industry in part, or in whole, for an unjustifiable attack upon any phase of the business affects the whole industry.

Present Day Problems in Marketing. First in importance is to have an accurate knowledge of the market demand.

Demand may be classified into two sections — natural or normal and artificial. A natural demand is more easily discerned, while the artificial demand depends upon the effort put forth to develop it, and can be made just as profitable, even more so. It is essential to know in exact terms the quality, as well as the quantity required for immediate consumption. Quality carries with it the style of grading and packing most suitable for the practical handling of the wholesaler and the retailer, but primarily the requirements of the consumer. The consumer is the party that we must ultimately serve and satisfy if we succeed in stabilizing the market.

In Mr. Anderson's report on "Marketing and Distribution", he states that "Over 50% of the commercial fruits and vegetables shipped in this country originate in the territory west of the Mississippi River; and to a very great extent this production is consumed in the territory east of the Mississippi River. It was found that on 9,476 representative cars of fruits and vegetables the average haul was about 1,400 miles. Shipments of these commodities probably represent a longer haul movement on the whole than any other important line of commodities." Mr. Anderson could just as reasonably have concluded that approximately as large a volume was produced south of the Potomac and east of the Mississippi River, and marketed in the territory north of the Potomac and east of the Mississippi River. He could have gone even further and discovered an enormous movement of fresh fruits and vegetables from this so-called eastern territory, which produced large quantities of apples, cabbage and potatoes to supply not only the markets within this eastern territory, but furnish the southern markets with these commodities from four to six months of the year.

Our problem, then, is one of getting this production from these far distant points into these consuming markets and into the consumers' hands in the quickest possible time, so as to retain not only the fresh and attractive appearance, but in sound and merchantable condition. To perform this function properly, that is, of getting the goods from the producing section to the consuming centers, requires an accurate knowledge as to the character of the commodity, a lack of which results in a material loss to everyone concerned.

To be familiar with the character of these products, one must have first-hand knowledge of the conditions under which they were grown — soil, as well as climatic conditions.

To successfully handle the marketing problem, it is imperative that the harvesting and packing be carefully performed, as a large percentage of the waste in this industry is caused by injury to the commodity through the harvesting and packing process. These processes should consume a minimum amount of time, due attention being given to careful handling, so as to avoid injury to the fruit, subsequent to

which they should be placed on board cars and rushed to the market in the quickest possible time, as one day's delay on a six day movement may result in the fruit arriving in other than a fresh and attractive manner, which is so essential, as nine-tenths of the buying on the part of the trade, as well as the consumer, is based on appearance. This involves the method of conveying from field to packing house; the style of package most suitable; whether shipped under ventilation or refrigeration, and if under refrigeration, to what extent.

Growth of the Marketing System. It is within the experience of those present that the grower depended upon his individual effort in disposing of his products to so-called cash buyers; in the absence of which he would ship his products to nearby or distant markets, to be sold upon arrival by so-called commission merchants. The grower knew little, if anything, about market conditions, depending upon quotations received by wire or letter, indicating the price at which his particular commodity was selling for that day in the market. Each grower had his particular commission man in the various markets to whom he would ship. Shipments would be made under conditions where there was a light supply and correspondingly high prices, with the result that his goods generally arrived on the market with similar shipments from others, attracted by the favorable conditions, and as a consequence his goods were sold in competition with the heavier supply attracted by the favorable quotations, for less money.

This situation developed a line of operators known as "Carlot Distributors", generally with headquarters in one of the large consuming markets, who entered into a contract with the grower, not only to handle his goods in the market in which he was located, but in other large consuming markets where he had provided facilities for doing so. The Distributor encouraged producing centers to specialize on certain commodities, as well as the developing of certain varieties of the various commodities most suitable from the standpoint of production, as well as the requirements of the market. Communities began to organize into growers' organizations, in an endeavor to minimize competition from each other, and to develop proper standards of grading and packing.

The Government, both national and state, has assisted in this work through various activities of both national and state agricultural departments, which have been amply backed up by our educational institutions, until today it is recognized we have emphasized the matter of production, and if we have failed in any respect it is that sufficient importance has not been attached to the marketing phase of perishable products.

Even in these so-called enlightened days we find large growers' organizations succumbing to political influences

rather than confining their activities along sound economic lines.

Does it mean anything, or can it result in any permanent good to finance a grower beyond his ability to produce; whether it be on the part of a local merchant, a commission man, or a State or Federal Government? Have we not all been in local communities where the leading merchant or merchants advanced the grower money to produce his crop, taking a lien or mortgage on the crop or property, and in the meantime permitting the grower and his family to run up a big bill at the store, the object being to have this grower produce the crop and turn it over to the local merchant, who will dispose of it through such facilities as may be at his command, which are often inadequate, and generally based on loans which he in turn has secured from the merchant in the market, through whom he expects to dispose of the products. We have yet to see a prosperous producing community developed in this manner.

This is no worse than for one of our large western states to make it possible for their growers of Alfalfa to secure an advance of \$25.00 per ton, and make returns, or at least accounting at the end of the marketing season, indicating that the net average sale amounted to \$10.00 per ton. It is unsafe, as many of you growers well know, to advance the cost of producing a crop, as there are many conditions under which a crop may sell for less than cost; as witness the results of the past two years, where the cost of everything entering into the production of farm products has been abnormally high, and the market on most products correspondingly low.

National Marketing Agencies. To successfully handle a national marketing organization requires a large investment in marketing facilities, and few have entered the field. I assume that we are in agreement that national distribution is essential in order to secure maximum results. A great deal of our work must of necessity be along pioneer lines, yet with a full knowledge of fundamentals followed in other lines of successful marketing; the sum total of which is an adequate supply of a standardized product, sold under an advertised trade mark, to handle which we as distributors must have an extensive investment in experienced men:

- First:** For our field work, in order to maintain proper contact with the grower.
- Second:** For the equipping of sales offices to handle the distribution direct with the markets from the producing center.
- Third:** Ample facilities involving oft-times large investments in the consuming markets of the United States and Canada, of which there are some 200 important centers.

It is not only necessary to equip a selling organization of this kind with salesmen at shipping point and in the market, but provide experienced traffic men to see that the transportation of the commodities is handled in an efficient manner, and protect the grower and shipper alike against the neglect of the carrier to deliver his goods at destination in proper condition, at the published tariff rate, and what is even more essential than either the selling, supervision or transportation of the commodity, i. e., an adequate force for the collecting and proper accounting of the goods entrusted for sale and distribution, backed up with an assurance that an accurate accounting will be rendered, and a guarantee against loss through failure to make proper and prompt returns.

Growers and shippers are entitled to feel absolutely assured that they will receive in a prompt and proper manner, the money received by the distributor from the sale of the goods which they entrust to his care. Sufficient importance is not given to this phase of the marketing problem.

However, the methods under which perishable goods should be marketed provide a maximum safeguard against losses, some of which are cash at shipping point; delivery only upon payment of draft drawn against the commodity, delivery of which can only be obtained by payment of same, which carries with it an order upon the carrier; and the auction companies assume the risk where sales are made through that source.

Up until this moment I have mentioned little, if anything, about artificial methods for developing a demand for our products, and yet experience with the company with whom I am associated, has brought about most startling results, really beyond our fondest expectations, through the advertising of a standardized product under a national trade-mark, especially in those sections and on the particular commodities that we have been able to provide with an adequate supply; so much so that we have dispelled any doubt that was in our mind about the matter, and are prepared to put all our energy back of the idea.

You will pardon the mention of an incident that is more or less personal in its nature, but a news item reported that M. Clemenceau upon his recent visit to this country had added grapefruit to his breakfast menu. Our salesman, on the alert to take advantage of this announcement, sent Mr. Clemenceau a box of our particular brand of grapefruit, and received an acknowledgement from his secretary thanking us for our thoughtfulness in the matter, and stating that Mr. Clemenceau had not only added grapefruit to his breakfast menu, but specifically mentioned that it was our particular brand he first became acquainted with and inquired for everywhere he went. What is more to the point he left us a standing order for a

box to be sent to his home in France every two weeks. The fact that our particular brand was available in all the markets that he visited, and the further fact that it bore our electrically stamped trademark, assured him that he was getting what he ordered.

After all, our marketing problems resolve themselves into giving a man what he wants and will actually pay full value for and returning the producer his proper share of such sale price. This involves application of modern merchandising methods to bulky perishable food products and needs a world market. While some view our problem as simple, the most expert feel there is yet much to be accomplished.

Sheldon Funk: How well have the railroad companies developed their icing at icing stations, and could they improve the service so that we could have less claims at the other end?

Mr. Baggs: I think they could first of all improve the cars that they now supply. It takes more than paint alone, and it needs more than yellow cars to make refrigeration. If they will follow U. S. standards, and provide additional sidings and sufficient ice for the peak movements there would be less trouble. We ought to have an inspection at every icing point. There is a law, which has passed or is now before Congress, that requires the filing of an actual statement of conditions. If that law goes through, we may be better protected.

DEVELOPING A LOCAL MARKET

Harrison S. Nolt, Columbia: In our region we have curb markets, about four squares in length. They usually back the team up against the pavement. It is a rather satisfactory arrangement. There are a few roadside markets during the summer, and I believe these are successful. Our best markets, among the large growers, are the home markets. As you probably know Lancaster County devotes much attention to general farm crops and tobacco, and we have only comparatively few large fruit growers in the county. The bulk of their fruit is sold in the orchard. In our own orchard we sold over three-fourths of the fruit direct to the consumer and they hauled it away. You can readily see the advantage. No package of any kind is required, and you can also dispose of any inferior fruit which you have in this way.

In developing our home market we feel that the newspaper is a good medium, and the telephone. The past summer, especially with peaches, we noticed that we got better prices at home than we got in neighboring towns. We had more satisfaction, also, because there we had to compete with inferior grades, and most of our people preferred the better grades which they got at home. We can not grow enough stuff to supply our own local market. We have a large number of young orchards coming on. I think the most important thing

in developing any market, wholesale or retail, is to grow a good article and give good quality and measure.

P. S. Fenstermacher, Allentown: The previous speaker has covered the subject well. Some towns have no market system of any kind. We happen to be one of them. Some novel ideas have been advanced there. Some growers have rented a vacant lot, made a display and there sold their stuff; a very good idea. We have not gone into it, but it is one of the most direct ways from producer to consumer. When you grow more than the local market will take, you will have less money, because you will get less when you ship it away than when you sell at home. Cultivate the home market to the limit. In this way you avoid a lot of vexation, examination and damnation. There are lots of tricks between the grower and the consumer in the big cities, some of which result in the "gluts" on the market. You will have a report from New York or Boston that peaches are \$4.00 a crate, and by the time your car gets there you will get \$1.50. So cultivate your home market, the nearer the better.

What are we doing to make a home market? Are we doing anything to increase the consumption of our products? There are less apples consumed today than some time ago, according to the population. The citrus people have done everything in their power to advance their product. Their fruits are well known, and people know what they are getting. They can tell good oranges and grapefruit when they see them, and they know the quality. We can not say the same thing of apples. Most of the consumers do not know the difference between a Ben Davis and a Stayman, and it is hard to explain it to them, but they know the difference when they eat them. Would it not be advisable to inform the customer that these are eating apples, and that those are baking apples? Too many people are picking their apples when they are half ripe. Will that increase consumption? Do you want a second piece of pie from that kind of apple? All these things ought to be taken into consideration and remedied in some way.

I made a trip across the country to California some time ago. One morning when I took up the newspaper I saw in big letters, "PRESIDENT OF PENNSYLVANIA STATE HORTICULTURAL ASSOCIATION HERE". Now most of those people never heard of P. S. Fenstermacher (I doubt if they could even pronounce my name, let alone spell it), but the State Horticultural Association is known way out on the Pacific Coast. The same day the President of their State Association sent me complimentary tickets to a show, and invited me to the Lions Club meeting, at which Governor Stevens and some other notables were present. This was all because I was President of this Society. I met Henry Wilder there, too. I wish I had time to tell you how they are trying to grow apples

out there. It is pitiable in some cases. After what I have seen of Southern California, Pennsylvania is good enough for me.

S. R. Huey, New Castle: New Castle is our main market. It has upwards of 50,000 people. Nearby, we have Youngstown with 150,000, and Sharon with 25,000. We also have Pittsburgh fifty miles away, and the valleys in between are thickly settled with mining towns. The market is there; the only question is to go and get it. It is just a question of how good a seller you are as to what you get out of your stuff. There are carloads of apples shipped in there every year, and that has a good deal to do with the price. We try to get at least as much as the commission men get.

We sell most of our apples by the load to grocers. Personally I have never advertised except cider apples and apple butter apples, but we go in with a load. When we go to a store we are going up against a man who knows what they are worth, and knows the supply and all about it. Sometimes when you tell him you want \$1.50 a bushel, he will say that he got them for \$1.00 the day before. He may tell the truth, but you can ask him what kind they were. Probably he got them from some farmer who does not spray, probably wormy and scabby, not fit for anything but to feed to hogs. After you talk a little with him and show him what you have, if it is a good grade, you will get your price and doubtless be able to sell to him right along.

Then we have to contend with the man who will not take care of his orchard, or who picks everything off the tree and sells it as it comes, and gets whatever he can. It has not cost him anything to produce it. You can not do much with that class of fellows. You may sell to a man who has some culls which he will mix with yours, and sell them together in that way. Some grocers tell me that they get as much from seconds as from first grade, but that practice is unfair to the consumer.

We have never tried to develop the retail trade in our town. We do not have a market house. We have a curb market, but it is not patronized much by fruit growers. There are some farmers who sell a general line of products, but fruit growers, as a rule, have not used the market. A good retail market could be worked up if someone would go after it. One reason why it has not been prominent is that the grocers do not like it. They do not like to have the farmers go after the retail trade. I sell a lot of stuff through orders over the phone. People drive out and get it. Then we do not have to bother about packing. I sell a lot to the fellows whose orchards have been killed by San Jose scale. They come eight and ten miles to get their winter supply of apples. One man who formerly had a large orchard buys his apples each year from me.

When we do sell to the consumer I always try to get the full retail price. It is not fair to the grocer to undersell him. He has his business to keep up, and we ought to protect him to some extent. I generally sell for fifty cents a bushel above what I would get from the grocer. Sometimes people call up and want to know how much fruit will be if they come out for it. I tell them the same price, because when they do come out they always want to pick over the fruit, and that takes up time.

Then there is huckstering. I tried that method once, and got a good price, but it took me all afternoon, and I decided that I could use my time better in some other way, and that I would let the grocer do the retailing hereafter.

H. C. Brinton, Hanover: There is one thing of importance that has not yet been brought out in developing the local market. How long will it take you to do it? I have been on the market for ten years, and I could not develop it in a year, or two years. If any man is going after the home market, he can not go there with one year's crop only. He must dispose of this year's crop with the idea of developing trade for future years, and if he does not want to do that he had better stay off the market.

A man came on our market this year and had better apples than I did. We were selling at the same price. He was not known. Because his apples looked better he sold more than I did. A little later I asked a wholesaler about the man's apples. They were found to be not properly sorted and inferior to the sample in many respects. The dealers would not want more of his apples at any price. There is a great difference between developing a local market and selling this year's crop.

Question: If apples are \$1.50 a bushel wholesale, to the man who ships to commission merchants in Philadelphia, what should he get when he takes them to a local grocer; how much more?

Sheldon Funk, Boyertown: When fixing a price I usually take the best price I can get on big markets, and sell to the grocer at that price, less commission. Make him pay for freight, because he would have to pay that any way. We do not regard average prices. We try and hold a certain price even if the market goes up or down.

PROGRESS OF THE CENTRAL PACKING HOUSE MOVEMENT IN THE EAST

P. R. TAYLOR, Acting Director, State Bureau of Markets

While essentially a development on the Pacific Coast, the central packing house has recently made rapid strides in the eastern states, so that it is becoming an increasingly important

factor each year. The older houses have been in operation for six or seven years, and methods, results, and costs have become sufficiently stabilized so that some general conclusions can be developed. Since the subject was assigned to me, I have had the good fortune to be able to discuss this subject with the managers and members of a considerable number of houses, so that many of the points brought out are the actual criticisms, both favorable and unfavorable, of the people in closest touch with the operation of such associations.

Present Status of Packing House Movement. At the last meeting Mr. Rees explained in detail the methods of operation of the Western New York organization and last September a group of growers visited several of these associations, so that you are all more or less familiar with this organization. It is sufficient to say that at last reports there were about forty local packing houses members of the central organization and that the sales have been handled by contract with the North American Fruit Exchange. Particular emphasis has been laid on the development of a standard uniform pack.

The past year was the first one of the operation of the Jersey Peach Growers Cooperative Association, which is a central organization with six packing houses at the present time. As a new organization operating in a year of rather general poor markets, this association had its share of difficult problems. Sales were handled in a similar manner to the New York organization, but at certain packing houses, particularly the one in Camden, attention was paid to the development of a local trade for peaches with good success. Considerable work has also been done to secure better distribution of truck shipments in the territory in close proximity to the producing section. In this respect the New Jersey development is of more interest to many of our growers than the other organizations.

In Delaware, Maryland, Virginia and West Virginia there have been local associations formed in many places, but there has been no decided effort to federate their activities into state or sectional organizations. Various methods of sale are used and it seems certain that larger units will gradually develop from the local associations.

One of the older organizations of this character is the packing house at Biglerville in our own state. It seems peculiar that while the fruit growers of Pennsylvania have probably been the slowest group to become interested in the central packing house idea, one of the real successes of cooperative marketing in the East has occurred within fifty miles of our place of meeting. Those who are considering the development of new projects in Pennsylvania can do well to profit by the years of experience which a few of our own members have had in the Biglerville organization.

During the last year, the packing house at Collegeville has had its first season and a charter has been secured for an association at West Chester and similar action is under consideration at other points in the state.

In connection with this subject it seems appropriate to mention the recent organization of the Federated Fruit and Vegetable Growers, Inc., and the purchase by it of the control of the North American Fruit Exchange. The actual operation of the new agency began on January first last and this development is of decided importance to the central packing house movement. While undoubtedly the bulk of the business in the near future will be the same as that of the North American Fruit Exchange, the existence of such a growers controlled organization should simplify some of the problems of the new central packing houses in Pennsylvania and other states.

Essentials to Success. In the first place, there must be a cooperative spirit in the community and no packing house can succeed in a community where suspicion and ill feeling toward neighbors prevails. There must be a mutual respect and a strong interest in and effort to solve these problems by joint action for the ultimate good of all concerned.

Any business must have a sufficient volume of business to carry the overhead expense reasonably in order to be successful. There must be enough fruit handled to make the cost of paying for the building, interest, repairs, equipment, etc., a reasonable charge per package in addition to the necessary labor. Too small a volume usually means an excessive cost or else labor which is used inefficiently. On the other hand, too large a volume frequently results in congestion, unnecessary delay, extra handling, and frequent dissatisfaction of members. The equipment, shed space, storage space, and other facilities should be sufficient to handle the maximum amount of products offered both efficiently and quickly.

The question of membership and the location of a packing house are both important subjects in the establishment of a new association. The packing house should be in a central location and the experience of others indicates that five or six miles is the maximum haul that can be handled satisfactorily by the grower. Of course, there may still be a few who are at a longer distance from such a house, and good or poor roads and grades will have some effect on the exact mileage. Small houses are being operated efficiently with a seasonal capacity of about eight thousand barrels. Success is more certain if there is a volume of from fifteen thousand barrels up, as charges with this volume come closer to competing with farm packing costs. A grower who has enough fruit to supply such a packing house himself can secure little benefit by hauling to a more distant house. He can secure the benefit of brands, central selling, etc., by working in cooperation with his neigh-

bors and should be interested from that standpoint alone. The large number of varieties is a real problem in the New York organization, as it slows up packing, reduces capacity, increases cost of operation, and makes selling more difficult, particularly when many of the varieties are not popular market varieties. The experience of the past season has taught the New Jersey organization that they must handle apples as well as peaches in order to secure greater and more continuous volume for efficient operation.

The question of the size and character of the packing house is exceedingly difficult to consider in a general way. Varying conditions make it impossible to make positive statements when weather, insect and fungus troubles and labor are all such uncertain factors. It is safe to say that a packing house must have sufficient capacity to handle the peak load which it will have to care for. With proper lighting facilities it is possible to double the ordinary capacity by night operation for a short period of time by overtime work. There should be ample provision for storage of unpacked fruit and loading and unloading platforms should be conveniently arranged for rapid handling. Large storage capacity for empty packages, preferably overhead, is desirable as it makes possible early purchase of supplies and reduces work in rush seasons. Barrel factories are being satisfactorily operated in a number of instances. A cider mill is also proving a very satisfactory accessory for the disposal of the poorer fruit. The value of a good by-products outlet is reflected not only in the price received for cull fruit, but also in the better pack and grade which is prepared for market.

Financing. The financing of packing houses has frequently caused troubles which result in a serious problem for years. In other states, particularly New York, the initial building was financed on notes of growers commonly for three years which were held by the local bank which furnished the money to construct the building. The plan in actual operation contemplates withholding a certain amount each season from the growers returns to apply on the note. Usually these notes are for the same amount regardless of acreage and, therefore, the small grower is compelled to provide as much capital as the larger grower. On the other hand the note of the larger grower is paid up at an earlier date and he then receives no interest on his investment. While an easy method to finance a packing house in the beginning, it is an unsound one and is almost sure to lead to future complications.

A much better remedy is the financing of the building through an ordinary mortgage, with the balance of the money secured through the sale of certificates of indebtedness. These bear interest and can be sold to anyone, although the bulk of the money should be contributed by growers if possible. In-

stead of attempting to pay for the investment in three or five years, at least eight and preferably ten should be allowed. All charges for interest and repayment of principal should be included in the regular operating charge and not scattered in various minor costs for different purposes.

Pooling Sales. No central packing house can operate successfully except by the pooling of sales into a common fund from which an average price is determined and payment made to the grower in proportion to the amount of the various grades which he has furnished. It is obvious that careful grading and accurate records are essential to successful pooling. Pennsylvania growers, as individuals are apt to hesitate in favoring "pooling" because they believe that they produce a better quality of fruit than certain of their neighbors and therefore cannot afford to average the price of their fruit with the inferior product. But they forget that if their fruit is better, the percentage in the higher grades will be larger, and therefore the returns to the grower will be greater.

There seems to be a very well established tendency to make a "pool" include the sales of a certain size of one grade of one variety for the entire selling season. In some cases, a separate grouping of fruit held in storage is made, but this is not the universal practice. A system of advances makes it possible to pay the grower the large percentage of his returns before the final pool price is determined when all sales and charges are known. Much the same method is commonly used for pooling peach sales.

Honest packing and adherence to recognized standards is essential to successful operation. Lack of attention to this principle will cause just as much trouble among the members themselves as among customers. In the case of apples, quarter inch sizes are prepared and sufficient work has been carried on so that there is a better market for this product than for the product packed under the older method of sizing. Similar methods on peaches are being developed.

Storage facilities are desirable. Precooling rooms are of great value in the handling of peaches, but usually adjacent storage for apples has proven to be more practical than storage as a part of the packing house. This is not true of common storage in the Northwest, and it is easily possible that a system of such storage for short periods may become practicable in our own state.

Standardizing the Pack. And now we come to the real purpose of a central packing house, which is a standardized pack and product. It is a well recognized fact that the average grower can pack fruit cheaper than it can be packed for him at a central packing house. The usual charge for packing is about thirty cents per barrel for apples, and from ten to fifteen cents per bushel for peaches. Facing this fact, the

only real justifications for a packing house are a more uniform pack, more efficient selling, and community action as against individual action.

If it costs more to handle through a packing house, are the returns sufficient to justify the additional costs? Where there has been efficient management and reasonable chance for success, the answer seems to be uniformly — That the packing house *does pay*. When analyzed in practically all cases, the reason for success is the development of a standard, uniform pack that can be pooled, guaranteed to the buyer, advertised and sold for better prices.

The New York organization has grown from a few associations to forty houses marketing half a million barrels a year because both grower and buyer found this method more satisfactory. The packing house at Biglerville has had the reputation of turning out a superior product which has netted prices better than the market. At the meeting of the Maryland Horticultural Society early this month it was publically stated that the entire output of the Inwood, W. Va. packing house was sold by the middle of September last because of the high quality of the 1920 pack and the shipping point inspection certificate with every car.

Recently we have been asked to help straighten out a controversy here in Pennsylvania in which the buyer claims that he bought the best of the fruit in a certain orchard (whatever that was) and later claimed that he did not get what he had purchased. In this particular case he received only a fair grade of apples, so it is easily possible that he expected and was entitled to better fruit.

From which packer would you buy if you were a dealer and would therefore be compelled to make refunds out of your own pocket if the fruit handled did not prove satisfactory to your customers? The answer is obvious, and in actual practice we find higher prices being paid regularly for the article which is known to be uniform and dependable.

The proper grades for use in this section of the country have been tried and tested for a long enough time so that there is every reason to believe that satisfactory grades can be used if the grower really desires to do so. The central packing house offers the best method to secure a standard pack and then to obtain a better price through centralized selling.

Prospect in Pennsylvania. In the commercial producing sections of our state conditions are so similar to those in the other large producing districts where associations have been successful that it is safe to say that the central packing house will be a success in south central Pennsylvania if local conditions are reasonably favorable. Associations will be formed just as rapidly as growers are convinced of the soundness of the proposition and of the need for it in their particular com-

munity. From the local associations, some central agency will gradually develop which will render those services which it can more effectively carry on, such as selling, advertising, etc.

But many of our Pennsylvania growers are interested in local markets rather than in the larger markets where their product comes in direct competition with the fruit of the entire country. Can the central packing house be made a success under such conditions? In this field we do not have the experience of others to guide us to any extent. It seems just as certain that a local market can be developed to its capacity only with well graded fruit and a steady supply. The value of advertising is unknown by most Pennsylvania growers and successful advertising is *absolutely* based on a standardized product. Within the next few years small packing houses, probably located in some of our cities in the fruit producing areas of the state, will be in operation for the grading and sale of the fruit locally. This may seem like an impractical dream, but it is being done in certain other parts of the country on similar products. Many of the present packing houses in adjoining states find that the truck buyers who came to them to purchase fruit are becoming an increasingly important outlet for their product. In some cases ripe peaches have brought more than the fruit selected from them for shipment because markets within forty or fifty miles were better than the usual commercial outlets.

Recent test campaigns show that the consumer is ready to do his share if there is a practical method of distribution and advertising developed to enable him to buy heaviest at the time when the market has its best quality and largest supply. The working out of such a method is the problem of the producer, and results should be distinctly in his favor. While the central packing house may be a short distance ahead, the time is already here when growers around a city can start an association, do the packing themselves on standard grades, and advertise jointly to develop their local market and increase the consumption of local fruit to at least as fast as new orchards come into bearing. And in answer to the original proposition "Is the central packing house practical for Pennsylvania growers?" I submit the following records of carlot unloads of apples and peaches in the fifteen larger markets of Pennsylvania during the years 1921 and 1922 and the important sources of supply.

Carlot APPLES unloaded at 15 Pennsylvania Cities

Important Origins	1921	1922
New York	3,134½	2,896
Washington	2,146	1,742
Delaware	60	459
Pennsylvania	483	397
West Virginia	146	156
Maryland	52	133
Total Unloads	7,476½	6,326
Total Shipments from Pa. crop year	226	1,626 to date

Carlot PEACHES unloaded at 15 Pennsylvania Cities

Important Origins	1921	1922
Georgia	1,483	979
New York	417	972
North Carolina	131	217
Delaware		102
Pennsylvania	48	94½
New Jersey	2	61
Total Unloads	2,310	2,789½
Total Shipments from Pa. crop year	45	207

New York, Washington and Georgia have sold this large volume of fruit in our markets because of the central packing house, organized selling and advertising. Can we refuse to use their successful methods any longer?

Question: What is the cost of packing in central packing houses in comparison with private houses?

Mr. Taylor: The largest single cost is the price of labor in a community. Many times it is possible to get it close to orchards at lower prices than can be secured in central packing houses. Another factor is the difference in the output of the central packing house, where the various varieties of different colors have to be separated until they have been graded. A machine with a capacity of five cars at a central packing house will take care of six cars for the individual. It may cost more, but this is more than offset by the convenience to the grower, and the higher price received.

Member: I think it would be well to have two machines, each one of 500 barrel capacity.

Mr. O'Neil: One of the big factors in the increased cost of packing in cooperative packing houses is that the average grower puts his most skilled help on the packing operation, whereas the cooperative packing house has to hire indifferent help at a big price.

R. J. Gillan: Why is it necessary to have higher priced help in the packing house than in the orchard?

Mr. O'Neil: In a private packing house the help is hired the year around, and the grower uses it for different purposes, whereas in the cooperative packing house it is seasonal employment, and the men are not quite as efficient as the men who have been working at it for years.

Mr. Taylor: I think it is safe to say that most of you, in your own orchard work, look out for the packing yourselves. When you figure up your costs do you charge yourself with what it would be if you were not there?

President Fletcher here read the following Resolution adopted at the York Imperial Apple Conference held at Frederick, Maryland, in January, and attended by representatives of the Virginia, West Virginia, Maryland and Pennsylvania Horticultural Societies:

"The first step in the more effective distribution and sale of the York Imperial is to standardize the pack. It is the judgment of this Conference that the most practicable method of attaining this end, in many parts of the York Imperial territory, is to organize community cooperative packing associations. Ultimately these may be led to federate under a central selling agency; but for the present, the emphasis, in each of the several states comprising the Cumberland-Shenandoah District, should be placed on the organization of local units. It is recommended that each of the several State Horticultural Societies represented here shall appoint three members to serve on a Joint Committee on Standardization of Pack. The function of this Committee shall be to consider plans for securing a better and more uniform pack throughout the Cumberland-Shenandoah District, by means of Central Packing Houses and otherwise, and to report its findings and recommendations to the several State Horticultural Societies for further action."

On motion the Resolution was referred to the Resolutions Committee for further consideration.

VALUE OF FRUIT CROP ESTIMATES AND REPORTS

JOHN C. SCHMIDT, York

Statistics are of no value unless we use them — and like religion, or any other fundamental truth, are only worth what we, ourselves, put into them.

The modern business man can no longer run his business with any degree of success unless he studies the statistics that pertain not only to his own business but to the entire industrial field. In the main, his problems, as applied to marketing,

are the same as ours, namely, Supply and Demand — but unlike the fruit grower, the manufacturer in slack seasons can control or reduce his output and we can't (at least to any appreciable extent), and thus with little control of the supply, the demand end becomes of more importance.

But, if each individual grower is relatively powerless to control the production or supply, is it not all the more important that the statistics supplied by the Government, especially as to the supply, be accurate? But, on what are these Government statistics based? Is it not to a very considerable extent that which each grower more or less thoughtlessly gives out?

A great railroad organizer once said, "Full, accurate and ample information is the first requirement of success". Do we as growers give sufficient thought in making up our estimates of growing crops? I know how difficult it is, but would not greater care on our part present a truer statement of conditions? Do we consider the proportion of good marketable fruit, or do we simply estimate (and very roughly estimate it too), what our total crop is, including under sized fruit and low grades which can never be sold as a commercial pack. While it is wrong to either consciously or unconsciously mislead others, it is doubly wrong to fool ourselves.

Under the careful guidance of Mr. Rasmussen, our late Secretary of Agriculture, we, for the first time, were asked for a report, by varieties, of apples. Two such reports were made of the growing crop and last week we were asked to report the result; I strongly suspect that the actual commercial crop will fall far below the earlier estimates — and why? Because I fear the reports have not been carefully made out by the growers themselves, and what is still more to the point, so few growers even answered the questionnaire. I am told that the Department only receives 30% of replies — is it fair to ourselves? This in part illustrates what I have said, "That we only get out of statistics what we (as a class) put in".

In the paper business, in which industry I am interested, every manufacturer must send, to the Federal Government, sworn monthly statements of his operations, as to grades, production, stocks and shipments. This is published by the Government in the trade papers monthly and both buyer and seller are thus informed of the true condition of the industry.

I cite this to show how the commercial world values statistics, and this by the way, is one reason that the manufacturers as a class are more prosperous than the farmer. This, however, is by no means the only reason, another and greater one is that he cooperates with others much more than the farmer, or as a rule, the fruit grower.

The fruit grower is too indifferent — necessarily he works alone and independently in his production, and because cooperation is more difficult, he markets his products independently — and why? First, he thinks that his fruit is better than the other fellow's; that his trade comes to him direct and if his fruit were marked collectively he would lose his identity, good will and his already established trade. He seems to forget the demand end of the big question which regulates all prices — Supply and Demand. It is only partially known to him, that all sales are based on price, quality and service, and what he lacks in service, i. e., delivery at the proper *time* and *place* is a stronger factor even than quality, for in an empty market a poorer quality will obtain a better price than even a higher quality, if shipped to a market already glutted.

We can no longer follow the haphazard ways of the past and if we want to make fruit growing a financial success, we must follow the trail blazed for us by the western fruit growers, and more recently by those of our neighbor to the North — Western New York. We must get away from individualism and learn and practice cooperation. Don't let us be afraid of helping the other fellow, for it is an absolute fact that we cannot help others without helping ourselves.

P. R. Taylor: In New York the Department has a satisfactory means of getting information for that state. They have a plan which gets 350 reports in to them from members of the Society, and those reports are grouped by counties, and by important commercial varieties, the early and late varieties of apples, peaches and pears. The only ones of interest in Pennsylvania are apples and peaches. We have tried to check up on estimates so as to get actual facts this past year. In this respect, however, this report's success will depend absolutely on cooperation and the accuracy of the estimates received. If this subject is of sufficient interest to the growers action by this Society tomorrow morning along the lines suggested by Mr. Schmidt would be of value to the Department in putting something through that would be of help to the fruit growers.

Dr. Fletcher: Mr. Schmidt will you please draw up a resolution to place before the Society at the business session tomorrow morning, through the Resolutions Committee?

Mr. Schmidt has very kindly presented this Association with a gavel which was made from a branch of a York Imperial apple tree growing on his Springwood Farm, York. You will recall that this farm is the birthplace of the York and that the Association placed a marker there two years ago. We are under obligations to Mr. Schmidt for this gavel.

F. O. B. SALES VERSUS CONSIGNMENT

W. E. GROVE, York Springs

I think this subject was passed on to me on account of a statement I made in the last annual meeting that I was interested in placing any fruit this year in the hands of some strong selling organization rather than to attempt to handle it through my own efforts. In the past our fruit has largely been consigned to four different cities, the bulk to Baltimore or Philadelphia. I can not compare the results of F. O. B. sales this year with consignments for all our fruit was sold F. O. B. with the exception of two cars. If I can find some good friend who will put all his figures on the table, then I will be able to make comparison, but I am mighty well pleased with this year's work, as I can learn from general mingling with fruit men.

We are in Adams County, and we had four different lots of fruit, part of our own production, part not of it. We packed at two different places with pretty good packing facilities, Grimes Golden, York Imperial and Ben Davis. I will refer to the sale of forty-eight cars of fruit sold on the track. What advantage did we see in making this change? I felt that I was not able to give the attention that would be needed both for the production of the fruit and the selling of the fruit. It left me free on the production and packing end. We were connected with an organization that had a national selling force. We had reserved to ourselves by our sales contract the right at any time to sell a car of fruit to any buyer, provided we should pay to the selling organization a small percentage as a part of the transaction. We could sell ourselves if we could sell to better advantage. We did not find an opportunity this year to place to better advantage than our sales agency.

When we made our contract we were asked, "Can you pack the fruit right?" I had to say, yes. Now if you are going to have this selling agent offer a car of your fruit, how shall he describe it? He does not see it. How can he tell the buyers in New York, Boston, or Jacksonville, or St. Louis, or any other point, what you have? We thought we would try to follow grades established in Pennsylvania, and then we found that Pennsylvania today has no established grades. Our barrels were marked Pennsylvania A grades, and the inspector agreed to it that they were Pennsylvania A grade, but he also agreed that Pennsylvania has no legalized A grade. We shipped forty-eight cars of fruit. We had three inspections and one rejection. The rejection was justified.

My conclusion is that I believe that the wholesale fruit grower of Southern Pennsylvania must join up in some scheme of central marketing, through an agency of national scope. We must get away from the promiscuous selling to one man and another, in different years.

WHAT IS THE BEST PACKAGE FOR APPLES AND PEACHES FOR A LOCAL MARKET?

H. C. Brinton: I can only tell you what we are using. I do not handle many peaches, but on the local market for early peaches they run them in quart boxes, and later on in 14 and 16 quart splint baskets. Some are handled in bushel baskets. For winter apples, I think my best package is my storage cellar.

In getting them on actual market from the orchard or storage, most of us use bushel crates. We go on the curb market and sell by measure, and it is a convenient package to handle there, and when you go around to the retailer it is a convenient package there. According to an arrangement we have with the merchants we leave the crate and let them sell out of it. If the package is clean it makes a good display. The bushel crate is a full bushel (level full), and we can pack one on top of another.

In developing the local market do not be afraid to advertise your name. On all my crates I put my name, wherever they go. I see many crates on the market without a mark to tell to whom they belong. When we are trying to develop a market I think the grower's name on containers is a very important thing.

At the Show I saw a peck splint basket, made up much as the bushel basket. Some people are catering to roadside trade, and that makes an attractive basket. I talked with a gentleman today who has been using them. He puts a fancy grade of apples in them and gets a dollar each.

RESULTS OF PRELIMINARY TRIALS OF PENNSYLVANIA APPLE GRADES

W. C. LYNN, State Bureau of Markets

At the beginning of the 1920 season, tentative apple grades were proposed by the Pennsylvania Bureau of Markets. These grades were practically the same as the Proposed Barreled Apple Grades issued by the Federal Bureau, and their use was optional with the grower. However, the purpose was to make a test and determine whether the requirements were applicable to Pennsylvania conditions. In the three crop seasons, two were spent in trying out the grades, 1921, of course, being exceptionally light. As a result of these trials, it is felt that the requirements concerning freedom from diseases and blemishes are correct. Color specifications, however, were open to

discussion; minimum percentages of color required may be illustrated by mentioning a few well-known varieties:

Penna. Fancy		Penna. A
75%	Baldwin	25%
75%	Winesap	25%
50%	Jonathan	25%
50%	Stayman	25%
50%	Rome	15%
50%	York Imperial	15%

These percentages, however, seem to be considered correct by a majority of growers. The State of Virginia has adopted for optional use about the same standards as tried out in this state, but there is a small difference in the color requirements. It is hoped and expected that some time in the future, at least the four states of Pennsylvania, Maryland, Virginia and West Virginia, comprising a Middle Atlantic District, will have a uniform standard of grading for apples.

The difference between the present general standards of good individual grading in Pennsylvania, and the proposed State Grades, is in the color requirements. Other specifications, covering diseases and blemishes, are about similar. This, therefore, would show that upon adoption of State Apple Grades, practically the only additional point to be held in mind in the average good packing house would be that of color.

Question: What is the difference between these proposed grades and the present system of grading by individuals?

Mr. Lynn: I do not see very much difference at all in the matter of disease and blemish. When we come to color, a good many growers could be more strict in the kind of apples they put in A grade. Some stock is a little too green, and if graded according to the proposed grades would not meet requirements.

Dr. Fletcher: Some of our neighboring states have established grades by legislative enactment, and if they want to change their grades, it must be done by a change of law. The State of Pennsylvania has given to the Secretary of Agriculture the authority to define and promulgate grades. A number of growers have been trying out these tentative grades before they are established. I think this is a common sense way of determining what will be best.

HOW FAR WILL IT PAY TO HAUL APPLES TO THE PACKING HOUSE?

D. M. WERTZ, Waynesboro

Much has been said today about central packing houses, cooperative associations, central markets, etc. I do not think too much has been said, indeed not enough. It seems to me that the salvation of our business largely depends upon the classifying or standardization of our product. If Mr. A, a few miles away has a packing house, and Mr. B in another direction has one, and Mr. C another, how can we expect uniformity? If I break a spray rig I can telephone and have the part duplicated immediately. It seems to me that much the same principle should apply with our barrels or cars of apples, and the more we can consolidate them the more we can put that principle into practice.

This brings up the transportation question. This is not so much of a problem since we have good roads and trucks. When the boxes are tightly loaded they can easily be transported several miles or more to advantage. I am told that in Maryland they are transporting apples ten miles to the packing house. I do not see why apples could not be hauled before being packed to an advantage rather than after being packed. It seems to me that it would pay to transport them from six to eight miles and then pack there.

In my own particular case we hauled about 12,000 barrels four miles to the packing house, and about 5,000 barrels six miles. I question whether packing was not more expensive, but it certainly was more efficient. Instead of having three outfits, three superintendents and three crews trying to put up a uniform package, so that the product coming from three sources would be the same, there was but one. It was possibly more expensive under one organization, but more satisfactory to have it consolidated, and in some regards possibly more economical. Surely we could make a more uniform pack under one organization than under three separate ones.

Mr. Grove: What package did you move the fruit in?

Mr. Wertz: Ordinary orchard bushel boxes, so arranged that they would ride one on another, the empty boxes next.

PACKING APPLES IN BOXES

S. H. WERTZ, Reading

We have been packing in boxes for several years. In our local markets around Reading we find they are always demanding boxes. So we have wrapped the apples, and put them up in a manner similar to the western pack. The chief ad-

vantage of putting them up this way, from the consumer's point of view, is in the great uniformity. Every apple in the box will be like the others, and the grade is higher. I do not think that anybody would put an apple in a paper and in a box if it were not first class. I have been getting better prices for apples in boxes. They look a whole lot nicer. It conveys the idea at once that they are first class apples. What I have packed this year have been selling at \$3.00, and I had a few Rome Beauty that I am selling at \$3.50 a box, and if I had more I know that I could sell them at nice figures.

Another thing — the box ships better. People have been sending them for Christmas presents. We have sold about thirty bushels in boxes to one of our customers. They were shipped to Europe this year, going to a dozen people over there. We have gotten several replies, and half of them have stated that the fruit was in first class condition when received, and the other half stated the fruit showed some bruises on the sides, which were probably due to tight packing.

But there are some disadvantages to this method. You can not get your fruit on the market as quickly; it takes more time, the containers cost more money, the cost of packing is higher, and the biggest objection is we can not get skilled men to box pack. Our men are slow. It is difficult to get men of experience. That has been our reason for not putting up more this year in boxes.

I find that the box market wants a certain sized apple. We have packed nothing but three inch and above in boxes, and we can not get them too big. The three inch makes about 104 to the box.

Question: What varieties besides Rome Beauty?

Mr. Wertz: Grimes Golden and Stayman Winesap.

MAKING APPLE BUTTER

J. M. BALTHAZER, Wernersville

I find that it does not pay to make any salable apples into apple butter, only the culls. There is no way of disposing of culls to better advantage. We use steam. We can boil a quantity of apple butter in a shorter time than by the kettle method. There is no need of paring apples, simply wash them, put them in the barrel and put in the steam coils. Boil until they are reduced to a pulp; put this through a colander; after that they are put into a barrel and cider added which has been evaporated a great deal.

The chief thing in the making of apple butter is to make a smooth product, and this depends largely on the steam. The quicker it is made the nicer color you will have. If it is done by a slow process you get a dark color. If the steam has

been kept up it will look just like jelly. With the first batches I got a burnt taste, until I found out I must put in the sugar before I put the steam coils in.

Question: What kind of apples do you use for filling in?

Mr. Balthazer: I take the best of the culls for the boiling apples.

Question: How long do you boil?

Mr. Balthazer: That depends on the steam. I always like to have between 60 and 70 pounds of steam. Then I can make 50 gallons inside of two hours.

Question: Have you used the double kettle?

Mr. Balthazer: No. We have barrels and have long coils that we put in. We have ordinary molasses barrels with the end knocked out. That makes a very fine barrel.

Question: Do you have much trouble in keeping the butter off the coil?

Mr. Balthazer: Every batch we wash it off.

Question: How do you make steam?

Mr. Balthazer: Use a good sized boiler. We have a 70-horse-power boiler.

H. C. Brinton: I went through the Libby plant in Delaware this fall, and I was struck with the cheapness with which they do the work. They ground the apples up into juices and cooked the whole business together. They did not fool with cider. They were getting apples at 8 cents a 5/8 bushel basket from the people around there. They were good grade apples too. I was surprised, but did not pity the growers a bit. There is no reason why the men in that section could not employ the same labor and work for themselves, rather than to work for this large corporation.

WEDNESDAY EVENING, JANUARY 24, 1923

President Fletcher opened the meeting at 7:30 P. M., and announced that a number of questions which had been laid upon the table would be taken up before the addresses of the evening.

Is Hail or Frost Insurance Practicable?

Dr. Fletcher: As far as I know this has not been used in Pennsylvania, although hail insurance has been offered by several companies. The premium usually is five per cent, which seems to most growers rather high for the protection secured. Where the hazard is very great it might be practical, but I have yet to discover that it is used by fruit growers to any extent, but the Lancaster County tobacco growers use it considerably.

Mr. O'Neil: The way we insured this year was at 5 per cent, or \$2 a tree, and we selected the variety. At first when they made the proposition we were to leave the damages to arbitration. We were not satisfied as to how to know what damage was done by wind and how much by hail, so we had them take the crop at \$2 a tree. We insured our Elbertas. I do not think it is an entirely satisfactory arrangement, but because of the past bad years, and because we are in the hail district, we thought we should do so.

Dr. Fletcher: The companies are also considering frost insurance. The basis on which the principal is to be paid if the present plan is carried out, is not whether damage was done, because you can hardly estimate that until along in the summer, but as to whether or not frost actually did occur in that locality, whether it damaged the crop or not. In other words, they will take the records of the nearest weather bureau, and if they show that between certain dates, comprising the blooming season, the temperature did drop to the freezing point, they will pay the premium whether your orchard was damaged or not. In short, they bet with you that there will not be any frost at all. So it is just possible, according to the plan being considered, for a grower to get damages of \$200 an acre, and get a full crop too! This does not look like a common sense proposition to me.

What is the Effect of Nitrate of Soda on the Color of Apples?

Prof. R. D. Anthony: Good color on apples is the result of two things, sunlight and full maturity. Anything that influences sunlight or the degree of maturity influences the color. If you do anything to a tree that increases the foliage you increase the shade, and consequently decrease color. If you do anything which makes the tree more vigorous, less willing to settle down to its winter resting period, you slow down the time that the fruit reaches maturity. Nitrate of soda will increase the foliage and increase the vigor of the tree. You can by the use of nitrate of soda on a sod orchard, decrease color and delay the time at which the fruit reaches maturity. On the other hand, the proper use of nitrate of soda, by giving trees the right degree of vigor, will result in a fine rich color of a well matured apple, and at the same time bring them into maturity at the right time. While there is a possibility of danger in the too free use of nitrate of soda, that possibility is one that should not in any way deter us from using it conservatively, especially on sod trees.

Willis A. Hess: That is one of the things that we are concerned about. Last year when we sold our apples, for the first time we found objection from buyers to fruit from the nitrate treated trees. A man from New York was there, and related a number of unfavorable experiences with storage apples

treated with nitrate. This man was impartial. He had nothing to lose or gain. He did not condemn the use of nitrate, but he made us feel that there is great danger in using too much of it. In our efforts to be good to our trees I believe we have carried it too far. Professor Anthony speaks about your bringing about the condition whereby maturity is delayed. This may be true, but not in our experience this year. We made two pickings of York Imperials. We found that no matter how long they were left on the trees they were not of good color. They were apples on the lower part of the tree. This condition was not true before last year. Delaying the picking of the fruit did not change the color, the past season, as it usually has done.

Dr. Fletcher: This year was not favorable to good color anyhow, because of dry weather and lack of frosty nights at harvest. It was a seasonal matter more than the result of nitrate, I believe.

Mr. Hess: I know of a number of orchards where the conditions seemed like ours, with the exception that they did not apply nitrate. Where they had not used nitrate they had better color. This complaint from buyers has been made before.

Mr. O'Neil: I know a man who used barnyard manure heavily, and then followed that with two pounds or more a tree of nitrate of soda on trees nine years old. The peaches came on about three or four weeks later, in variety (Elbertas) than with the rest of us. Among his Delicious apples a great many developed core rot. I want to ask if that core rot came from the over use of nitrate?

Prof. Anthony: I would expect that the condition that you speak of would favor the over growth of the apple and hence the core rot. Any condition that gives a large overgrown apple of the Baldwin, gives also Baldwin spot. The core rot is much the same nature.

The effect of nitrate on the peach we may well take advantage of. We have an experimental block in Erie county; the nitrated trees were two or three days later in maturity, which meant 25 to 35 cents on a bushel.

Should Apples be Pruned Heavier the Off Year Than the Full Year?

Prof. Anthony: This brings up the question of the influence of pruning on alternate bearing, a problem that has not yet been settled. There are a half dozen experimental horticulturists working on how to overcome alternate bearing.

The apple bears mainly on spurs. If a spur makes too heavy a growth, it goes out of the fruit bearing function and grows for a year, and then may settle down to bearing again. In other words, we can throw a tree out of bearing if we throw

the spurs into too heavy growth. If our trees are alternate bearing varieties, like Baldwin and York, what we want to do is to throw some spurs out of bearing on the full year, and force them into bearing a year forward, which would be the off year. Whatever you do to the tree in the early spring of the off year to discourage some of the spurs from forming fruit buds will tend to make the tree bear more two years hence. Rather heavy pruning in winter or early spring of the year during which the fruit buds are being formed (the off year) will tend to throw many of the spurs of that tree into heavier growth, and give you a better chance for alternate bearing varieties like Baldwin and York. They should be pruned heavier the off year.

Present Situation of Raspberry Culture

Paul Thayer, State College: The raspberry industry in the United States is in a very serious condition. It is having a great deal of trouble from the disease called Yellows in red raspberries; in black raspberries it is called Blue Stem. It is a disease that injures the plant growth and spreads to adjoining plants, and will wipe out an entire patch. The nurseries all have it. It is given the same treatment as peach yellows. In a certain state institution they reduced the percentage from 3.7 to less than 1 per cent by eradication. I have found it in plantations almost all over the state. It behooves every planter of raspberries to get as clean plants as possible, and then watch the patch, and when you find a plant that does not look right, tear it out and destroy it at once. Treat it like peach yellows, for it is just as serious as peach yellows.

Howard Chase: I would like to know about blackberry rust. What do you advise?

Mr. Thayer: The same control as for yellows.

Is it Profitable in the Long Run to Transplant an Apple Tree Which Has a Spread of at Least Eight Feet?

Member: It has been done, but I know of only one particular tree, and the tree bore a nice crop of apples last year. I do not think it would be a good commercial practice, however. The transplanting of young apple trees used as fillers is not practicable.

Is it Advisable to Graft Stayman Winesap or the Delicious on York Imperial?

Member: The Stayman outgrows the York stock.

Howard Chase: I have a few trees that I top grafted, and they are doing all right.

Does Reducing the Amount of Lime-Sulphur in Summer Spray on Apple Reduce Russeting?

Member: Yes, but you may get the spray so weak it won't control scab. Better use the Dry-Mix lime-sulphur on those varieties.

Does Addition of Kayso to Lime-Sulphur Arsenate of Lead Summer Spray Reduce Russeting on Stayman Winesap Apple?

Dr. Fletcher: I should say, no.

Is the J. H. Hale Peach Hardy in Bud?

Member: Not as regular or dependable a bearer as the Elberta, but it is all right and brings a good price.

Mr. Peirce: A man near Gettysburg had no crop except of Hale. The frost that hurt the rest of his trees did not hurt them. There may have been some difference in the pruning of which I do not know.

Prof. Anthony: The Delaware and New Jersey Stations noticed a condition that some of us may have noticed. The J. H. Hale may have a few large peaches and then a lot of little ones. In New Jersey they suspected it was poor pollination, and they found that the J. H. Hale is practically self-sterile. I have been getting some very irregular reports on Hale from Delaware and Chester Counties, and some of the trees were in large blocks. I feel certain that it is because of the poor pollination of the Hale. If we have large blocks of it the only thing to do is to interplant if there be vacancies with some other variety for cross-pollination, blooming at the same time.

Member: Our Hale are irregular in size compared with any other peach, even when exposed to cross-pollination.

Is it Practical to Use Smudge Pots in Pennsylvania

Member: We have had them about four years. We had the pots lighted four times in four years in Allegheny County, on the border of Butler. We found that where we had the pots one year it helped somewhat, but we have decided that it is not practical, and we are not using them today.

Member: I covered three acres in York County some years ago. The first crop paid all expense, and left me a small profit. I had peaches when nobody else had them. Since then I have not had to use them. We need them only once in twenty years in our section.

Question: Would it justify a man to buy them, then?

Member: If the first crop pays for them!

What Variety Shall I Top Work on King David in Berks County?

Sheldon Funk: It is not worth much. I would top work them. Grimes Golden would work well on King David, I think. King David has not justified itself in Pennsylvania.

Is Sweet Clover Desirable in the Orchard?

Dr. Fletcher: I saw a splendid illustration of it in Allegheny County, the only one I have ever seen. It was in a peach orchard.

Member: I have grown it, but did not have much success with it.

Member: We grow sweet clover in a peach orchard on top of a hill, not in good soil. We had to do something to get growth. Last year we seeded it to sweet clover. We plowed it down this last spring, and the evidence is on the trees now. We have a fine orchard that made practically as much growth last year as in three years prior to that, and I think it is the best cover crop that you can put in a peach orchard.

What are the Approved Methods of Destroying Pine Mice in an Orchard? The Mice That Go Down Into the Roots?

Member: Mr. Mayer got rid of them by the aid of blacksnakes. He will not kill nor allow any of his help to kill a blacksnake, and he has gotten rid of mice through them. His orchard is in Lancaster County. He says that the people who kill the blacksnakes should realize that they are killing good friends. Cats are good, too. If you can keep cats they will go a good way toward preventing mice injury. Some dogs are useful also.

R. J. Gillan: We have no trouble with mice, and I have warned my men not to kill snakes.

Member: Skunks are the best method of getting rid of mice in an orchard.

Following this discussion, the Association listened to a very interesting address by Dr. W. A. Taylor, Chief of the Bureau of Plant Industry, Washington, D. C., covering certain phases of the work of the Bureau that are of interest to fruit growers. A humorous address by Lafayette Temple, of Baltimore, followed. Apples and cigars closed the program for the day.

BUSINESS SESSION

Thursday Morning, January 25, 1923

President Fletcher called the meeting to order at 9:30, and asked for the Secretary's Report.

REPORT OF THE SECRETARY

H. F. HERSHEY, Hamburg

Inasmuch as the finances of the Association will be reported by the treasurer and the membership will be taken care of by the Membership Secretary, the Secretary will confine his Report to the Summer Trip.

The summer trip this past year was held August 1 and 2. The first day took in the Bridgeton-Glasboro section of South Jersey. The second day was spent in the Moorestown-Riverton sections, not far from Philadelphia and Camden.

The first stop was at the Seabrook Farms, near Bridgeton. These have 1,500 acres of fruit and vegetables. Production is on a vast scale and it requires a large organization — nearly a thousand men — to take care of the production and marketing of the crops they grow. They have their own cold storage plant on the place on their own railroad siding. Manure is brought in by the train load and other supplies in like manner. Scarcely a weed was to be seen on the entire place and all rows were as straight as it was humanly possible to make them.

Some idea of the size of the enterprise may be gained from the fact that there are 275 acres under Skinner irrigation on strawberries and vegetables. We saw a 60 acre field of rhubarb and at least 100 acres of beans. They were getting ready to plant many acres of celery at the time of our visit. Fifty acres of lettuce are grown. The apple tree rows were miles long, and in the near future will start producing on a very large scale.

We had lunch at Bridgeton and in the afternoon visited the Minch Orchards. Mr. Walter Minch took especial pride in the large fields of alfalfa. The Minch Brothers are fruit and vegetable growers on a large scale and it was interesting to note their success with summer apples. They find the Wolf River a profitable variety as it gets large size and they market it early. The Starr is also one of their profitable summer apples.

From Bridgeton we went to Glassboro where we were taken through the Repp packing house and cold storage plant. Mr. Repp thinks very highly of the bushel hamper as a package for storing apples, as the package is well ventilated and

it does not take so long to cool the fruit. At this point the trip was broken up by a heavy downpour of rain through which the party returned to Camden and Philadelphia.

The first stop on the second day's trip was at the Camden Packing House of the New Jersey Fruit Growers' Cooperative Packing Association. Mr. James Klahre, the manager, explained the operation of the plant and detailed the manner in which they kept track of the growers' fruit and how their pools were operated.

Further stops were made at the orchards of Senator Emmor Roberts, Preston Roberts and at Barton Brothers' Fruit and Truck Farms. Most of the Pennsylvanians were of the opinion that the Jersey Fruit Growers could bring their orchards into bearing more cheaply than we can. Their sandy soil, nearness to large markets, and system of truck intercropping accounts for this. In one orchard Barton Brothers were successfully using asparagus as an intercrop.

The last half day of the trip was spent at the Japanese Beetle Laboratory at Riverton and in the Lippincott Orchards. The ravages of the Japanese Beetle certainly are serious and it is to be hoped that the Government men and others in charge will soon be able to work out control measures. If not, it will mean one more serious pest for Pennsylvania orchardists to fight, as it is slowly spreading in this state.

There were twenty machines in the excursion and all agreed that the trip was time and money well spent.

Our thanks are due to A. Freeman Mason of the New Jersey Experiment Station and other Jersey Growers, who so kindly arranged the trip and escorted us through the different sections. We trust that we may sometime have the pleasure of repaying them by having them visit the orchard and truck gardens in Pennsylvania.

TREASURER'S REPORT

E. W. THOMAS, King of Prussia

Receipts

Cash balance January 26, 1922.....	\$ 662.31
1-28-1922, From H. A. Schantz, balance dues for 1921.....	16.00
3-11 " " H. A. Schantz, annual dues.....	300.00
4-22 " " Interest on \$100 Liberty Bond.....	2.12
5-4 " " Interest on \$500 Liberty Bond.....	10.62
5-4 " " H. A. Schantz, annual dues.....	202.00
6-24 " " Interest on \$200 Liberty Bond.....	4.26
9-16 " " Interest on \$100 Liberty Bond.....	2.13
10-28 " " Interest on \$500 Liberty Bond.....	10.63
12-2 " " H. F. Hershey, sale of fruit and vegetables.....	40.75
12-2 " " D. M. Wertz, refund of premium money.....	1.50
12-2 " " New membership.....	2.00
12-2 " " Advertising in report.....	52.00
12-2 " " Lancaster County Asso. membership.....	55.00
12-2 " " Adams County Asso. membership.....	33.00
12-2 " " Franklin County Asso. membership.....	57.00
12-2 " " Interest on \$200 Liberty Bond.....	4.24
12-30 " " Interest on Deposits, General Account.....	4.73
1-6-1923, " Interest on Life Membership Fund.....	1.91
1-20 " " H. A. Schantz, balance annual dues, 1922.....	20.00

\$1,482.20

Disbursements

2-7-1922 To G. E. Smith, 1,000 cards.....	\$ 4.00
2-7 " " H. A. Schantz.....	7.75
2-7 " " F. N. Fagan.....	13.88
2-7 " " Torsch & Franz Badge Co.....	13.88
2-7 " " H. F. Hershey, Secretary.....	111.11
2-10 " " Geo. W. Kendrick 3d & Co., \$500 Liberty Bond....	489.53
3-2 " " R. B. Cruickshank.....	45.32
3-11 " " O. M. Taylor.....	45.79
3-16 " " James E. Klahre.....	16.90
3-24 " " Sheldon W. Funk.....	8.25
3-24 " " H. A. Schantz.....	1.50
12-1 " " H. A. Schantz.....	12.00
12-1 " " The Hamburg Item.....	37.55
12-18 " " Williamsport Printing & Binding Co.....	618.00
1-25-1923 " Cash on hand.....	56.74

January 24, 1923. \$1,482.20

We the undersigned auditors have examined the accounts, bills and vouchers of The Pennsylvania State Horticultural Society, Edwin W. Thomas, Treas., and find the same correct, receipts and cash balance carried over from last year \$1,482.20; disbursements \$1,425.46.

PRESENT ASSETS OF THE ASSOCIATION

Cash on hand.....	\$ 56.74
Liberty Bonds.....	800.00
Life Membership Fund.....	62.08

Total Assets.....\$918.82

S. R. HUEY }
W. O. BINGHAM } Auditors

REPORT OF MEMBERSHIP SECRETARY

Received from Dues during year 1922

Annual Memberships.....	\$462.00	
Life Memberships.....	60.00	\$522.00

Remittances forwarded to Edwin W. Thomas, Treas.

March 4, 1922.....	\$300.00	
April 28, 1922.....	202.00	
January 16, 1923.....	20.00	\$522.00

List of Members, January 1, 1923

Life	143	
Annual (Paid).....	223	
Annual (Unpaid).....	144	510

List of members at last year's meeting.

Life	151	
Annual	315	466

INCREASE DURING YEAR, 1922.....44

This does not include new members added to the Association through the affiliation of County Horticultural Societies; there are about 120 of these, making a total gain of 164 during the year.

H. A. SCHANTZ, Membership Secretary.

On motion, a vote of thanks was given to the Membership Secretary for his excellent work during the past two years.

REPORT OF THE GENERAL FRUIT COMMITTEE

R. D. ANTHONY, State College, Chairman

THE STANDARD VARIETIES OF APPLES IN PENNSYLVANIA

In the report of this committee last year the statement was made that twelve varieties of apples would cover 75 per cent of the orchards under 25 years old. The present report is an attempt to present more detailed information of these varieties and also of some of our newer sorts. Part of the information was secured from a survey of over a thousand fruit farms made two years ago and part from a questionnaire sent out a few weeks ago.

Why should we be interested in the question of varieties? This has been studied for generations and there is more good literature available than on any other pomological subject, yet it is still a live and often a troublesome problem. The State of Pennsylvania has lost about ten million apple trees in the last twenty years. Most of these were in the small neglected orchards and the commercial industry has probably gained by this loss but a considerable proportion of these should be replanted to supply fruit for home consumption. We are just beginning to realize the tremendous advantage this state possesses in its splendid nearby markets and we are beginning to expand our plantings to supply these markets. The next ten years will see a considerable increase in our fruit plantings so the question of varieties is still one needing careful consideration.

No other eastern state has an agriculture so diversified as Pennsylvania because of its size, its wide range in topography and the concentration of so many of its urban people into five different parts of the state. A careful study of the fruit industry of the state shows that it is possible to divide the state into five quite distinct regions. The accompanying map shows the outlines of these and suggests names for them. So widely different are these regions that in studying any one variety we cannot consider it for the state as a whole but must study it in each of our five regions.

Baldwin. This is distinctly an apple of the northern portion of the state, becoming a fall variety in the Southern and Southeastern Regions. The severe winter killing during the last five years has discouraged many from planting this variety and one of the pressing problems is to find substitutes for the Baldwin. If it is retaining its popularity in any part of the state it is in the Beaver Valley north of Pittsburgh.

Ben Davis. Outside of the commercial car-lot area this variety is now almost universally in disfavor. Its quality is so poor that only the least discriminating of the local markets

will handle it with profit. In the Southern Region the ability of this variety to stand hard usage and long storage will continue to give it a place on the commercial list but even here the number of trees being planted is rapidly decreasing.

Black Twig. This may have a limited place in the Southern and Southeastern Regions to extend the season because of its better keeping qualities than Stayman, but its fickleness in bearing is against it.

Delicious. It was a surprise to see what a large proportion of the growers consider this variety as still on trial. The size is sometimes a little too small, it frequently scabs badly and it has shown considerable water core in the last two years. In spite of these defects it is evident that the variety is going to take a permanent place in our lists for all but the northern and higher parts of the state.

Grimes. One needs to plant Grimes with considerable caution anywhere outside of the Southern or Southeastern Regions. In this area it has proved highly profitable in spite of some undesirable tree characters. It is promising in the more temperate portion of the Western Region.

Golden Delicious. This variety is so new that it is not possible to know much of it. The few who have fruited it think it doubtful if Golden Delicious is any better than Grimes.

Hubbardston. The large number who reported this variety as promising and worthy of planting in a small way was surprising. Most of these growers are selling in local markets in the Southeastern, Northeastern and Western Regions. The chief defect is its short season.

King. This is distinctly an apple of the northeastern and of the northern part of the Western Region. Yet, even here, it needs a favored location because of its susceptibility to winter injury. Few varieties have suffered more collar blight yet it would be too bad to see this fine old sort dropped from our list for home orchards.

McIntosh. Many growers think this kind should not be planted when Smokehouse, Grimes and Jonathan can be grown satisfactorily but in the northeastern and in the northern half of the Central and Western Regions it should be planted on a considerable scale. Its susceptibility to scab makes it a difficult variety to grow. The new McIntosh seedling, Courtland, introduced by the Geneva Experiment Station, promises to extend the McIntosh season ten days or two weeks.

Rome. This has now a secure place in our variety list for all regions of the state and is one of the varieties being used as a partial substitute for the Baldwin. Rome hangs long in the fall and keeps well even in common storage and from January on it is one of our best bake apples.

Smokehouse. The natural home for this sort is in the local market orchards of the Southeastern Region, though a few are found in the commercial orchards of the Southern Region. Even though there has been considerable frost injury with Smokehouse of late years, its popularity is still undecreased.

Spy. In spite of this variety being so slow in coming into bearing, it still remains one of the favorites of the Northeastern Region. It is so widely and favorably known on the local markets that it commands a premium price which more than makes up for its slowness in bearing. The northern parts of the Central and Western Regions also like it and its hardiness makes it well suited to this territory.

Stayman. A considerable amount of frost injury with this variety in some regions in three of the last four years has in no way shaken the popularity of this fine apple. In the older orchards in the Southern Region, Yorks outnumber Staymans five to one but in the young orchards these two varieties are about equal. Stayman is slowly finding its way into all the regions of the state and, while it will probably never be of great importance in the most northern areas, it will continue to increase in favor in all parts of the state.

Stark. This should not be confused with the apples sometimes spoken of as Stark's Delicious. The true Stark is a winter apple which is used in the Northeastern Region as a substitute for Baldwin and, although the color is sometimes unattractive, its good keeping qualities and hardiness make it a desirable apple for planting on a small scale.

Summer Rambo. The competition from New Jersey and Maryland has seriously affected the market for summer and early fall apples. In spite of this Summer Rambo continues to prove profitable in the Southern and Southeastern Regions. It is little used outside of this territory.

Wagener. Wagener belong in those parts of the state which are also adapted to its parent, Spy. Its tendency to come into bearing early and for the fruit to drop off in size as the tree grows old makes it almost an ideal filler tree but its value in the permanent orchard should not be overlooked.

Wealthy. This variety does well in all parts of the state and has been planted to a considerable extent in the younger orchards. It has been planted heavily in New York and New England but growers do not seem to fear that it has been overplanted for the local market demand.

Winter Banana. This is one of the disappointments among our more recent varieties. When well grown it is wonderfully attractive but in many places in the state the color has not been satisfactory and the quality is so poor that it is not in favor in the local market areas.

York Stripe. The general concensus of opinion is that this variety cannot compete with Rome and that it will soon drop from our lists.

York Imperial. If one were to judge from the rapid decrease in the proportion of Yorks planted as compared to Staymans, this variety is falling into disfavor. This is not true. It is true that those growers who supply a local market are finding the York of too poor quality to use as one of their leading sorts; but in the carlot area of the Southern Region York and Stayman will be grown in about equal proportions for many years to come. York is to southern Pennsylvania what the Baldwin is to western New York. Where the Baldwin succeeds the season is usually too short for York to be a success.

In the hope that it may save some of our growers loss from an unwise choice of varieties, this report is respectfully submitted by your committee:

W. P. BALDESBERGER, Allegheny County,
W. O. BINGHAM, Franklin County,
P. R. BOLTZ, Lebanon County,
W. E. GROVE, Adams County,
DANIEL LUCE, Erie County,
J. S. WALKER, Chester County,
F. H. FASSETT, Wyoming County,
B. D. ANTHONY, Centre County, *Chairman.*

Member: I wish to ask Professor Anthony what he knows of the seedless apple?

Prof. Anthony: At the Geneva Experiment Station they tried to grow all the seedless apples that they could find, and all were disappointments. Take an apple that has one side poorly developed and cut through it, and the side poorly developed almost always is seedless. I feel that there is very little chance of our getting a seedless apple that will maintain size, so I am not looking forward to the time when we will use seedless apples. We may get apples with smaller cores, however.

W. O. Bingham: What about the Cortland?

Prof. Anthony: That is a cross breed between Ben Davis and McIntosh. It has a good many promising features. It has enough Ben Davis to be a better shipper than McIntosh, it stands handling and storing better than McIntosh. It is also from a week to two weeks later in season and it carries enough of the fine quality of the McIntosh to be a good eating apple. However, one should get only a tree or two and see what it is like.

Sheldon Funk: How about Ranier?

C. J. Tyson: I saw it in the Northwest. It is an apple of as good character as any they have there, and they have turned toward it for that reason, but as it lacks in color there I imagine it would be the same here.

Prof. Sanders: I have received a number of inquiries recently about the Opalescent.

Prof. Anthony: The Opalescent belongs to the same class as the Twenty Ounce. I am afraid of it for this reason. It blights very badly, and that for Pennsylvania is almost a condemnation. I doubt very much if we want to do much with Opalescent until we have given it a very thorough trial, and I would not want more than one or two trees to try it. It is a very fine looking apple, with a solid red color, and smooth skin, but only fair quality. Its size and appearance are distinctly in its favor.

Howard Chase: The Opalescent was propagated by a nursery in Ohio, but they stopped because it blighted so freely, and that was my experience with two trees.

The Report of the General Fruit Committee was received, with the approval of the Society.

The Chairman of the Committee on Legislation, Mr. P. S. Fenstermacher, reported that no business had come before the Committee.

Report of the Committee on Peach Yellows

The Committee on Peach Yellows, in cooperation with the Bureau of Plant Industry has had two meetings, one at the State Capitol on March 17, and the other meeting yesterday, January 24.

In 1920 the Bureau of Plant Industry of the Commonwealth of Pennsylvania made a survey to get figures on the Peach Yellows in the state and inquired into the methods of control used in other states. The facts thus collected were placed before our Association in 1921, and a resolution was passed by us approving a Peach Yellows inspection service.

Under the supervision of the Bureau of Plant Industry inspections were made of commercial orchards in the principal peach growing sections of the state in the summers of 1921 and 1922, but this work was limited by reason of lack of funds to employ extra men for it.

Your committee to cooperate with the Bureau of Plant Industry in eradicating the Peach Yellows held a conference with Dr. McCubbin, representing the bureau, on March 17th, 1922, in the office of the Secretary of Agriculture. Dr. McCubbin outlined the work done and proposed, and the matter of funds to go ahead with was thoroughly discussed. We again

conferred with Dr. McCubbin at a meeting held in the rear of this room yesterday. It now appears that by reason of the state Budget curtailing the estimated appropriation required for the Agricultural, as well as other Departments, unless some change is made in the Budget, or the work provided for in some way by appropriation, the Yellows inspection will have to be curtailed in 1923 and 1924, and many fewer orchards inspected than in 1921 and 1922. Your committee therefore presents the following resolution to the Association for consideration:

RESOLVED: That the work done by the Bureau of Plant Industry of the Commonwealth of Pennsylvania towards eradicating Peach Yellows from our peach orchards is heartily approved by us; and that we request the Secretary of Agriculture of the Commonwealth to endeavor to extend, and not curtail, this inspection work, in order not to lose the advantage of the inroads upon this costly disease made during the past two years.

For the Committee, R. T. CRISWELL, Chairman.

The report of the Peach Yellows Committee was received with the thanks of the Society.

Business of last year was now called for.

Amendment to Constitution

The Secretary was asked to read a motion made at the last meeting involving a change of the Constitution, as follows:

"WHEREAS, Our Constitution according to a clause in Article 3, reads 'No one may serve as President for more than two consecutive years' be it

"RESOLVED, That Article 3 be amended so that the President may be elected as often as the organization sees fit."

Dr. Fletcher: The matter is before you for action. If you will allow me to speak on this motion from the chair, I hope the Association will not adopt it. The evidence is quite clear from experience here and elsewhere that a change of presidents from time to time is quite desirable. It brings in new interests and enthusiasm. What is the wish of the Association?

C. J. Tyson: I agree with the President's view, and the principle has certainly worked out, since it has been in force, to the good of the Society.

Howard Chase: I regret to disagree with our President and former President. I believe it is well to retain a president longer than one term.

S. H. Wertz: I offered the Resolution at the last meeting. My thought was that when we had a President who proved good it was not well to change for someone else, who may not be as capable.

A vote on the proposed amendment was taken, but the Chair being in doubt as to the result, the Secretary was instructed to count the vote by raised hands.

Dr. Fletcher: The motion is lost because it requires a two-thirds vote of members present to make an amendment to the Constitution.

REPORT OF THE COMMITTEE ON NOMINATIONS

C. J. TYSON, Chairman

In view of the fact that our Secretary, Mr. H. F. Hershey, who has filled the position most acceptably for five years, feels that it is entirely impossible for him to continue with that work, and since we have seen the work that Doctor Fletcher has done the past year and during the previous year in developing the County Associations, we make the following recommendations for appointment. The work is only started in various directions in regard to the counties, and if carried to its fullest possibilities will call forth not only a clear vision but a lot of real work. With these explanations, we make the following report:

President, C. A. Griest, Guernsey.

First Vice-President, H. C. Brinton, Hanover.

Second Vice-President, S. R. Huey, New Castle.

Third Vice-President, W. H. Weinschenk, New Castle, who becomes Chairman of the Vegetable Section.

Secretary, S. W. Fletcher, State College.

Vegetable Section Secretary, W. B. Nissley, State College.

Treasurer, Edwin W. Thomas, King-of-Prussia.

It was moved that the report of the Committee be adopted and that the Secretary be authorized to cast ballot for the nominees of the Nominating Committee. The motion prevailed, and these officers were declared duly elected.

President Fletcher now vacated the Chair, and Mr. C. A. Griest accepted it.

Pres. Griest: Gentlemen, I consider it a great honor to be elected to head this organization, and I assure you that it came to me as a great surprise. I had not the slightest doubt but that your President would be retained for another year at least. I shall do my best to serve your organization, and with the hearty cooperation of all the members I hope we can make the next year as successful as the past one has been.

A matter came before the Association at a former session concerning cooperation with the States of Maryland, Virginia

and West Virginia in putting on a Joint Show at Washington, D. C. It was referred to this session for action. The question is before you now.

Dr. Fletcher: The Executive Committee met last night and considered this. It was the opinion of the members that this Association could not endorse any proposition which would take the Annual Meeting and Annual Fruit Show away from its accustomed place in Harrisburg, but it might approve a special meeting and show at Washington, provided it does not entail a financial draft upon the Association. Unlike the other states involved, we have no state appropriation. We depend upon membership fees entirely, and if the show can be handled without making a draft on our finances, we think it would be desirable.

I move that this Association cooperate with the other societies as suggested, provided it can be done without financial draft on the funds of the Society, and that a committee of three be appointed by the President to meet with the other State Committees, and make arrangements for the special joint meeting.

The motion was carried. The President appointed the Exhibition Committee to serve in this capacity.

REPORT OF THE EXHIBITION COMMITTEE

F. N. FAGAN, Chairman

The Committee recommends that the Winesap be added to Class 9.

The Committee recommends that Class 15 be revised to read as follows: "County Association Exhibit. A certificate of merit, in addition to cash prizes, will be awarded for the finest displays of fruit by any county fruit growers or horticultural association affiliated with this association. Quantity of fruit limited to not more than 21 bushels and 35 plates. Any standard fruit package may be used, but it is desirable that a county use but one kind of package. Thus an exhibit would be all boxes or all barrels or all hampers or bushel baskets, in addition to the plates. No discrimination shall be made by the judge against any standard container; they shall receive equal weight. Not more than 15 varieties nor less than 5 varieties shall constitute the collection and they should be standard for the county represented. A list of growers who produced the fruit in this class must accompany the exhibit. An exhibit shall not be eligible unless at least 5 growers contributed to the display."

THE 1923 EXHIBIT

In the plate classes there were entered 437 plates of apples and 19 plates of nuts.

In the box classes there were 48 boxes entered.

In the bushel basket and bushel hamper classes there were 33 entered.

In the barrel classes there were 12 entries.

The committee is pleased at the interest in the county exhibits, in which there were six entries.

Through the cooperation of the State Farm Product Show committee, we were able to increase the premium money materially for the 1923 show. All of the plate exhibits were sold for the benefit of the premium list. All of the first prizes in other classes were retained and sold for the benefit of the premium list. As the premium list now stands it will probably be necessary for the association to retain all second prize package fruit and also second prize of the county association class to be sold for the benefit of the premium list.

The committee wishes to express their appreciation to the growers who exhibited. We feel that the 1923 exhibit was the best we have had for many years. We also extend thanks to the County Farm Bureau Agents who helped set up the exhibit.

AWARDS AT 1923 FRUIT EXHIBITS

CLASS 1, BARRELED APPLES

Entry No.	Variety	Exhibitor	Address	Award	
				Place	Amt.
158	York	E. B. Snyder	Jacks Mountain	1st	\$10.00
206	York	Eli Garretson	Biglerville	2d	5.00
205	Stayman	Eli Garretson	Biglerville	1st	10.00
203	Stayman	W. W. Boyer & Bro.	Biglerville	2d	5.00

CLASS 3, BOXED APPLES

130	Delicious	E. F. Kaufman & Son	York	2d	4.00
179	Delicious	H. C. Trexler	Allentown	1st	6.00
175	Grimes	S. C. Eschelman	McKnightstown	1st	6.00
131	Grimes	E. F. Kaufman & Son	York	2d	4.00
134	York	E. F. Kaufman & Son	York	1st	6.00
290	York	Bedford Co. Orch. Co.	Bedford	2d	4.00
181	Rome	H. C. Trexler	Allentown	1st	6.00
132	Rome	E. F. Kaufman & Son	York	2d	4.00
176	Stayman	S. C. Eschelman	McKnightstown	1st	6.00
182	Stayman	H. C. Trexler	Allentown	2d	4.00
180	Jonathan	H. C. Trexler	Allentown	2d	4.00
178	Baldwin	H. C. Trexler	Allentown	2d	4.00

CLASS 4, BOXED APPLES

291	Gano	Bedford Co. Orch. Co.	Bedford	1st	6.00
136	Opalescent	E. F. Kaufman & Son	York	2d	4.00

CLASS 5, ROUND BUSHEL BASKET

288	Baldwin	Alonzo Wolfe	Dallas, R. D.	1st	6.00
289	McIntosh	Floyd Fruit Farms	Hazleton	1st	6.00
137	Delicious	E. F. Kaufman & Son	York	1st	6.00
157	York	E. B. Snyder	Jacks Mountain	1st	6.00
140	York	E. F. Kaufman & Son	York	2d	4.00
199	Stayman	W. W. Boyer & Bro.	Biglerville	1st	6.00
139	Stayman	E. F. Kaufman & Son	York	2d	4.00
138	Grimes	E. F. Kaufman & Son	York	2d	4.00

CLASS 6, BUSHEL HAMPER

143	Jonathan	E. F. Kaufman & Son	York	1st	6.00
144	Grimes	E. F. Kaufman & Son	York	1st	6.00
210	Rome	S. L. Smedley, Jr.	Newton Square	1st	6.00
145	Rome	E. F. Kaufman & Son	York	2d	4.00
147	York	E. F. Kaufman & Son	York	1st	6.00
190	York	Orchard Farms	Spring City	2d	4.00
193	Stayman	W. W. Boyer & Bro.	Biglerville	1st	6.00
146	Stayman	E. F. Kaufman & Son	York	2d	4.00

CLASS 7, BUSHEL BASKET (Round)

292	Gano	Bedford Co. Orch. Co.	Bedford	1st	6.00
142	Black Twig	E. F. Kaufman & Son	York	2d	4.00

CLASS 8, BUSHEL HAMPERS

191	Black Twig	Orchard Farms	Spring City	1st	6.00
149	Stark	E. F. Kaufman & Son	York	2d	4.00

CLASS 9, PLATE APPLES

Entry No.	Variety	Exhibitor	Address	Award	
				Place	Amt.
234	York Stripe	Gillan Bros.	St. Thomas	1st	1.00
13	York Stripe	Geo. E. Shaw	Lewistown	2d	.50
23	Wagener	G. G. Close & Son	Lawrenceville	1st	1.00
88	Wagener	J. H. Hottenstein	Lehighton	2d	.50
24	Peck Pleasant	G. G. Close & Son	Lawrenceville	1st	1.00
87	Rhode Island Green	J. F. Hottenstein	Lehighton	1st	1.00
25	Rhode Island Green	A. T. Baird	Lock Haven	2d	.50
32	Sutton	A. T. Baird	Lock Haven	1st	1.00
41	Gravenstein	R. E. Briggs	Nescopeck	1st	1.00
156	Smith Cider	E. B. Snyder	Jacks Mountain	1st	1.00
64	Smith Cider	C. E. Ross	Sunbury	2d	.50
84	King	J. F. Hottenstein	Lehighton	1st	1.00
69	King	Enoch Reimer	Bangor	2d	.50
83	Pewaukee	J. F. Hottenstein	Lehighton	1st	1.00
264	Pewaukee	Tresslers Orphan Home	Loysville	2d	.50
86	Fameuse	J. F. Hottenstein	Lehighton	2d	.50
98	Fameuse	L. B. Rusterholtz	Fairview	1st	1.00
89	Ewalt	J. F. Hottenstein	Lehighton	1st	1.00
91	North Western Green	A. L. Wells	Fairview	1st	1.00
100	Belleflower	L. B. Rusterholtz	Fairview	2d	.50
116	S. Rambo	C. D. Snyder	Ephrata	1st	1.00
102	W. Rambo	L. B. Rusterholtz	Fairview	2d	.50
165	Stark	H. C. Trexler	Allentown	1st	1.00
151	Stark	E. B. Snyder	Jacks Mountain	2d	.50
160	Gano	H. C. Trexler	Allentown	1st	1.00
284	Gano	Bedford Co. Orch. Co.	Bedford	2d	.50
161	Oliver	H. C. Trexler	Allentown	1st	1.00
293	Oliver	Sheldon Funk	Boyertown	2d	.50
170	King David	H. C. Trexler	Allentown	1st	1.00
249	King David	H. W. Hartman	Harrisburg	2d	.50
163	Wealthy	H. C. Trexler	Allentown	2d	.50
263	Smokehouse	C. W. Hardt	Harrisburg	1st	1.00
211	Smokehouse	D. Rice	New Bloomfield	2d	.50
312	Gilliflower	D. Rice	New Bloomfield	1st	1.00
213	Roxbury	D. Rice	New Bloomfield	1st	1.00
218	Fall Pippin	D. Rice	New Bloomfield	1st	1.00
247	Paradise	D. M. Wertz	Waynesboro	1st	1.00
220	Paradise	D. Rice	New Bloomfield	2d	.50
285	Fallawater	Bedford Co. Orch. Co.	Bedford	1st	1.00
223	Fallawater	D. Rice	New Bloomfield	2d	.50
300	W. Banana	Eagle Mt. Orchard Co.	Chambersburg	1st	1.00
216	W. Banana	D. Rice	New Bloomfield	2d	.50
253	Ben Davis	D. M. Wertz	Waynesboro	1st	1.00
238	Ben Davis	Sheldon Funk	Boyertown	2d	.50
287	Opalescent	J. H. Lincoln	Clarks Summit	1st	1.00
249	Y. Newton	D. M. Wertz	Waynesboro	2d	.50
155	Black Twig	E. B. Snyder	Jacks Mountain	1st	1.00
252	Black Twig	D. M. Wertz	Waynesboro	2d	.50
221	Hubbardston	D. Rice	New Bloomfield	1st	1.00
355	Hubbardston	Gillen Bros.	St. Thomas	2d	.50
358	Winesap	R. T. Criswell	Chambersburg	1st	1.00
354	Winesap	D. M. Wertz	Waynesboro	2d	.50

CLASS 10, PLATE APPLES

Entry No.	Variety	Exhibitor	Address	Award	
				Place	Amt.
80	Baldwin	J. F. Hottenstein	Lehighton	1st	4.00
75	Baldwin	Enoch Reimer	Bangor	2d	2.00
21	Spy	G. G. Close & Son	Lawrenceville	1st	4.00
79	Spy	J. F. Hottenstein	Lehighton	2d	2.00
33	Delicious	J. M. Williams	Beach Creek	1st	4.00
54	Delicious	Dickenschied & Wineberger	Allentown	2d	2.00
119	Stayman	S. C. Eschelman	McKnightown	1st	4.00
118	Stayman	C. B. Snyder	Ephrata	2d	2.00
217	Rome	D. Rice	New Bloomfield	1st	4.00
153	Rome	E. B. Snyder	Jacks Mountain	2d	2.00
261	Grimes	C. W. Hardt	Harrisburg	1st	4.00
215	Grimes	D. Rice	New Bloomfield	2d	2.00
251	Jonathan	D. M. Wertz	Waynesboro	1st	4.00
65	Jonathan	C. R. Ross	Sunbury	2d	2.00
152	York	E. B. Snyder	Jacks Mountain	1st	4.00
340	York	Crawford Bros.	Fayetteville	2d	2.00
22	McIntosh	G. G. Close & Son	Lawrenceville	1st	4.00
286	McIntosh	J. H. Lincoln	Clarks Summit	2d	2.00

CLASS 14A, ENGLISH WALNUTS

338	Mayette	John J. Rush	West Willow	1st	1.00
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14B, BLACK WALNUTS

337	Stabler	J. J. Rush	West Willow	1st	1.00
228	Seedling	Alvin Blouch	Jonestown, R. D. 2	2d	.50

14F, SHELL BARK HICKORY NUTS

236	Weiker	John J. Rush	West Willow	1st	1.00
224	Seedling	Geo. W. Robb.	Alexandria, R. D.	2d	.50

CLASS 15, COUNTY ASSO. EXHIBITS

298		Berks County Horticultural Society, Dr. W. W. Libingood, Robisonia, Pa., Sec.	1st	100.00
295		Perry County Fruit Growers' Association, L. F. Rothrock, New Bloomfield, Sec.	2d	50.00
359		Franklin County Horticultural Society, W. O. Bingham, St. Thomas, Sec.	3d	25.00

The following Counties had very creditable exhibits:
 Chester & Delaware Fruit Growers Asso., H. S. Barker, Sec., West Chester.
 Lawrence County Fruit Growers Asso., S. H. Huey, Sec., New Castle.
 Luzerne County Fruit Growers Asso., J. H. Hutchinson, Sec., 226 Miners Bank Building, Wilkes-Barre.

C. J. Tyson: I move that the report of the Exhibition Committee be accepted with the sincere thanks of the Association. I feel like expressing gratitude to the Chairman of this Committee for his service over several years. It is hard work. The success of our Association has to no small extent centered around the Fruit Show. For fifteen or sixteen years we have had measurably good fruit shows, some better, some not quite so good, depending on the crop in the state in any particular year, but in a large measure dependent upon the activity and hard work of the Chairman of our Exhibition Committee.

P. S. Fenstermacher: I move that a rising vote of thanks be given to Prof. Fagan.

Upon action by the Society, the Secretary was instructed to record a rising vote of thanks to Prof. Fagan, Chairman of the Exhibition Committee.

REPORT OF THE RESOLUTIONS COMMITTEE

This was presented by Mr. P. S. Fenstermacher, Chairman.

1. RESOLVED: That the work done by the Bureau of Plant Industry of the Commonwealth of Pennsylvania towards eradicating Peach Yellows from our peach orchards is heartily approved by us; and that we request the Secretary of Agriculture of the Commonwealth to endeavor to extend, and not curtail, this inspection work, in order not to lose the advantage of the inroads upon this costly disease made during the past two years.

2. WHEREAS, So called "Daylight Saving Time" is not only inconvenient, but detrimental to agriculture, as well as many other industries throughout the State of Pennsylvania; and

WHEREAS, It is the belief of the Pennsylvania State Horticultural Association that standard time should be observed throughout the year;

THEREFORE, BE IT RESOLVED, That the Legislature of the Commonwealth of Pennsylvania enact a law requiring all state institutions and offices, public schools and public service corporations, to maintain standard time of this meridian throughout the year; and, be it further

RESOLVED, That this organization commend the Standard Time League of Philadelphia for its efforts in furtherance of this legislation.

Howard Chase: I rise to move that should there be a movement introduced into the Legislature to establish "Daylight Saving Time" during this coming summer, that our Legislative Committee be requested to appear before the Committee with this Resolution, which I assume will be adopted by the Society. The motion seconded and passed.

3. WHEREAS, the ravages of the Japanese beetle and the difficulty of control have become a menace to fruit and vegetable interests of the State, and

WHEREAS, the Federal Department of Agriculture stated that there must be more cooperation on the part of the states that are affected, therefore be it

RESOLVED, that this Association earnestly urge on the Legislature of Pennsylvania full and adequate support of the Japanese Beetle Control and Quarantine work now being carried out by the Pennsylvania Department of Agriculture in cooperation with the Federal Department of Agriculture.

4. WHEREAS, The total commercial crop of apples of the United States for 1922 is about 31,000,000 barrels or 93,000,000 bushels, and the total boxed apple supply is reported to be about 31,000,000 bushels or thirty per cent of the total commercial crop, and whereas, the inaccuracies in estimates of apple production are most serious in the eastern producing states, in which our members are particularly interested:

THEREFORE, BE IT RESOLVED, That a special committee be appointed to formulate a more complete system of collecting estimates of the Pennsylvania apple production in cooperation with the Pennsylvania Department of Agriculture, which will be of maximum value to our own fruit producers and of greatest service to them in the development of their markets within the state, and be it further

RESOLVED, That this Association pledges the complete support of its members in the development of such a service for the benefit of fruit growers of Pennsylvania.

P. S. Fenstermacher: How can a man have the audacity to give an estimate on a crop when it is only half matured? Who knows what it will be when it gets ripe, whether 30 or 50 per cent cider apples? This immense crop that is predicted and estimated hurts every grower. Something ought to be done in this matter. It seems to me that some of the Department heads seem to think that in order to hold up their end they must report A BIG CROP. If they do give out a report when the fruit is half ripe, why not state that the crop is immature, and that it is merely a guess. One guess is as good as another. The public takes these things at face value, and they think they will get apples for nothing this year. It is the same way in peaches, potatoes, etc., and something should be done about it.

Member: Some make reports with the hope that it will be published in the local paper. They want their name to appear as raising an immense crop, and they put down 100 bushels when they ought to put down 10.

Howard Chase: The crop reports are a good deal of a joke. It seems to me that the most accurate reports would be secured through our county agents.

Sheldon Funk: One of the most misleading features is that it is on the percentage basis. What is meant by a full crop? A full crop in York County, for instance, would be greater than a full crop in Sullivan County, or Wayne County. To add the percentages and divide the number of counties would not give you anywhere near the actual figures. Figures put out on the percentage plan are entirely misleading because they take into consideration counties which are not commercial fruit growing counties at all.

R. T. Criswell: I think the keynote is hit when you attack the percentage basis of making reports and estimates. There are different ideas on the part of producers as to what constitutes a full crop. One man will regard a full crop as all that his trees will carry after they are fully mature, and another man will regard a full crop as the fair average bearing capacity, and perhaps 60 to 75 percent of a bumper crop. It has occurred to me time and again that if the persons who send out statistics would ask the number of barrels and bushels the previous year, and estimate the number for the current year, they would get the statistics in much better shape, and then work out the percentages in the office.

Member: There is a bill before the House at present regarding the standard pack, and it might be well to pass a Resolution to approve that bill.

W. C. Lynn: At the present time there is a bill known as the Vestal Bill at Washington, for consideration of standardization of packages, and the suggestion has been made that the Association voice its approval, in letters to Senators Pepper and Reed, asking them to support this bill, which is now in the Senate.

J. A. Runk: I move that our Secretary be instructed to write a letter for the Association to both Senators Pepper and Reed asking their support of the Vestal Bill.
The motion was carried.

RESOLVED, That the Pennsylvania State Horticultural Society shall appoint three members to serve on a Joint Committee on Standardization of Pack. The function of this Committee shall be to consider plans for securing a better and more uniform pack through the Cumberland-Shenandoah District, by means of Central Packing Houses and otherwise, and to report its findings and recommendations to the several State Horticultural Societies for further action. (Resolution referred to Committee from a previous session of the Society.)

On motion the Chair was asked to appoint the above-mentioned Committee to meet with the other Committees from adjacent State Associations to serve in this capacity.

On motion the Report of the Resolutions Committee was then adopted as a whole.

THE GAME LAWS

Dr. Fletcher: I will read a communication to the Association from Geo. H. Lincoln of Clarks Summit, Pa.:

"I am enclosing a clipping from the Editorial page of the 'Rural New Yorker' under date of January 20th. The comment of Mr. Collingwood, the Editor, who is a real dirt farmer and fruit grower is certainly worthy of note. Isn't it time that the State Horticultural Association takes some action in regard to the high handed doings of this great and august body of city sports, viz., the Pennsylvania State Game Commission? Every farmer and fruit grower in this part of the state is damaged every year by the rabbit pest, and as a fruit grower who has to fight this meanest of all pests both summer and winter, I protest against the Pennsylvania State Game Commission bringing any more into this state for us to fight.

"What is the Pennsylvania State Horticultural Association in session going to do about it?"

Very truly yours,
(Signed) GEO. H. LINCOLN.

Clipping enclosed as follows:

A Rabbit Swarm for Pennsylvania

I am enclosing a clipping from the December 31, *North American*. In The R. N.-Y. of December 30, there was an article on planting rabbits at the roots of trees, and I think the farmers of this state (Pennsylvania) should know that the state is to furnish them in plenty. I think it is time the farmer had something to say about this kind of legislation. — A. K. Carleton, Pennsylvania.

We think so too, and thus we print the clipping:

Topeka, Kan., Dec. 30. — Pennsylvania is to be repopulated with rabbits from Kansas. "Cottontails" for the brush and timber sections, and jackrabbits for the open spaces, will be delivered in the Spring.

Moon C. Beck of Hutchinson has a contract with the Pennsylvania Game Commission to furnish 10,000 live rabbits for propagation in that state. Mr. Beck is a professional trapper of live game and ships rabbits, ducks, geese, antelope, throughout the United States and Canada, and coyotes, wildcats and other animals to Zoos.

Mr. Beck has just announced that he will pay 30 cents each for live cottontail rabbits. These rabbits can be

trapped in homemade box traps. Jack rabbits are rounded up and driven into netted inclosures. Nearly every farm lad in Kansas has one or two box traps for use this winter, and the fact that one rabbit will pay for one box trap is expected to stimulate the small boys in trapping the cottontails.

In the woods and waste fields around our own fruit farm are all the rabbits we need — and more. They are a great nuisance — killing many fruit trees each year. We can see no reason why our farmers should be expected to maintain this horde of rabbits in order that city hunters may tramp over our fields and have a day of "sport" now and then. We try to live up to the reputation of a "good sport" ourselves, but we can see no value in the proposed importation of these western rabbits. We are always ready to be "shown," but with the history of the Australian rabbit curse (not to mention local damage) in mind, we think this car ought to be switched off the line before it reaches Pennsylvania.

Pres. Griest: What action do you desire to take?

Howard Chase: I wonder if that is authentic that the Game Commission is going to flood the state with rabbits.

H. C. Brinton: I think a committee should look into this communication and letter, and report at the next meeting. It has two sides to it, and we should not take too quick action on it.

Howard Chase: I move that our President and Secretary be authorized to confer with the Secretary of the Game Commission and take such action as may be necessary.

D. M. Wertz: I believe that the Horticultural Society can not take too quick action, to find out what is going to be done. In another year the harm may be accomplished. We should do it at once if at all.

Member: I wish to amend Mr. Chace's motion so that it will state that the President and Secretary be a Committee to confer with the Game Commission at an early date, and that they be authorized to take such action as may be necessary for the protection of the fruit growers, not only concerning this phase of depredation but to make a thorough investigation of the whole subject of the relation of the Game Laws to horticulture.

The motion was seconded, and carried.

Member: It seems to me that it is time that the farmers and fruitgrowers have something to say about the game laws. Then there are not only rabbits, but deer and elk, and other things, and we should press our side of the question.

P. S. Fenstermacher: We invite hunters to come and hunt in the orchards, so as to exterminate the rabbits we already have, and I object seriously to bringing in 10,000 more rabbits for them to kill.

Mr. Haines: It might be possible to work out a system for cooperation between the horticulturists and the Game Commission on this matter. In Bucks County we have not a great deal of fruit growing. On our own place, with the approval of the Game Commission we have invited them to cooperate with us in removing rabbits from our orchards. We suffered a lot of damage three years ago. Since that time the game warden has provided us with box traps, and made arrangements with boys to tend them. Those rabbits were gathered and distributed in other places where they seemed to want them. If they would spend some of this money taking away rabbits that are a burden to you people, and putting them some place where they are wanted it would satisfy everybody.

C. J. Tyson: In the budget for the coming two years prepared by the Governor's Committee and presented to this Legislature, the amount provided for the maintenance of our State College falls about half a million dollars under the amount appropriated two years ago. Many of you know that State College has been living on starvation rations for a number of years. The money provided two years ago was entirely inadequate to the needs of the College. There is a strong demand throughout the state for increased facilities at the College, and for the continuation of the research work by the Experiment Station, and for more extension work. None of these things can be touched under the new budget, but some of the work of State College must be cut off.

If the cut is made as contemplated, either we must go through the student body and send home approximately 25 per cent of the students, and turn loose about that many of the faculty, or some other arrangement made. Another possibility will be to cut off all extension work, letting the county agents look for other jobs. One course or the other will be necessary if the amount suggested in the budget should go through. I, therefore, wish to present the following Resolution to this Society:

WHEREAS, The amount appropriated two years ago for the support of The Pennsylvania State College has been entirely inadequate and

WHEREAS, Any reduction in this amount would necessitate severe cuts in the work either at the College or in the extension field,

RESOLVED, That the State Horticultural Association through its officers and members use its utmost efforts to secure adequate support for State College at the hands of the

Governor and the present members of the Legislature, and further, that the Association give its support to any measure looking to the establishment of a State University at State College with the necessary provision for its permanent development and support.

D. M. Wertz: It is high time that this Association voices its sentiments along that line. No one would approve a move for economy more than myself, but there is a false economy also, and when State College is to be curtailed I think this Association is warranted in voicing its sentiments emphatically against it. There is such a thing as reducing expenses, but there is also such a thing as increasing revenue. There are two ways to economize. This is one way that I am strongly opposed to. State College should not go over the state asking for voluntary contributions from the voters of the State, and before the amount is completed, have our Legislature cut off the appropriated amount in this way.

I move that the resolution be turned over to the Executive Committee with authority to act immediately on the matter.

The motion passed the Association unanimously.

INSULATED VERSUS NON-INSULATED CONSTRUCTION OF COMMON STORAGE HOUSES FOR APPLES, AND OTHER RELATED PROBLEMS

L. M. MARBLE, Canton

Report from the Marble Laboratory, Inc.*

The value of insulated common storage for apples, with or without supplemental refrigeration by ice, as contrasted with non-insulated uncontrolled temperature storage in bank cellars, has formed the main feature of this investigation. In the conduct of the investigation, questions regarding other features of storage have arisen and been examined.

One of the questions most frequently discussed in Apple Storage is the desirability of quickly cooling the apples and prompt placing in storage. The question as to the temperature at which the storage should be held is not usually considered, it being assumed that any temperature colder than outside air would be beneficial in that it will reduce respiration and thereby delay the maturing processes.

Nor is there any distinction drawn between common storage and cold storage in the emphasis placed upon immediate storage as contrasted with delayed storage. It is assumed that in either case the more quickly the apples are placed in storage, the better.

*The Association is indebted to Mr. Marble for printing the graphs that accompany this article.

Types of Construction. In common storage the construction is gradually gaining favor of providing some means for reducing the temperature of the storage during the picking season and until settled cold weather. Two general types of construction are being introduced.

One construction is to build the storage house, whether above ground or below ground, of some material which has an insulation value; or, when the construction is of wood, to provide dead air spaces. Quite frequently shavings or other material is used for additional insulation. A building thus constructed is cooled by air ducts opened at night and closed during the day, every advantage being taken of the cool night air to hold the temperature in the storage chamber as low as possible by natural means.

Another construction is that of providing supplemental refrigeration to cool the storage chambers by the use of ice. The ice is sometimes arranged in a bunker or ice chamber at the top of the storage building, and cooling induced by the natural movement of the warm air up, over the ice, and down through the apples. In other cases air chilled by passage through an ice bunker is forced by fan circulation through the storage chamber, back through the ice, and again through the chamber, being recirculated over and over again, with or without occasional freshening by the addition of outside air.

In none of these houses is it attempted to hold a temperature as low as 32°. Storage at 32° and 35° with controlled temperature is cold storage, and is practical only in specially constructed and insulated houses equipped with mechanical refrigeration. The temperature usually obtained in ice cooled common storages probably ranges from 38° to 45°, with 40° as a constant temperature good practice. While the houses are being filled, higher temperatures undoubtedly prevail, dependent upon the temperatures at which the apples are stored, the number of boxes or barrels placed in the storage each day, the temperature conditions prevailing during the storage period, and other like factors.

We are operating in connection with our orchard a Bank Cellar Storage with stone walls, earth floor and concrete ceiling. No attempt at insulation has been made. The temperature of the storage closely follows the temperature of the earth, modified by the temperature of the air used for ventilation. Free ventilation with outside air is provided by both natural and forced draft. No attempt is made, other than by ventilation, to control the cellar temperature.

Temperature in Bank Cellar Storage. In three seasons of operation the temperature of the Cellar has behaved as follows:

During September it has varied between 55° to 63°, with 60° a fair mean temperature.

During October the temperature has fallen as low as 45°, but much of the time has been 55° with occasional days of 60°.

During November the temperature has sometimes been below 40°, but usually between 40° and 45°, more of the time near 45°.

During December the temperature has usually been under 40°, unless for some reason we have chosen to hold a higher temperature.

During January, and from then on until frost leaves the ground in the spring, temperatures of 34° to 38° can easily be held.

It has been our uniform experience that apples held in this cellar soften rather quickly, but hold throughout the entire storage period for the variety with very little loss from rot, with excellent flavor and good general condition. Our storage has uniformly been in slatted containers.

Whether or not it would be possible to improve the condition of the apples by holding at a lower temperature during the picking period on until the cold outside air gave satisfactory temperature control, has always been a mooted point. The emphasis placed upon such control in the very excellent bulletin issued last fall by the Division of Plant Industry, Department of Agriculture of Ohio, Bulletin No. 15, together with the work done by the U. S. Department of Agriculture in the Storage Cellar of C. F. Massey, Winchester, Va., the results of which are as yet not published, decided us to test the relative value of insulated versus non-insulated construction for common storage. We felt that if insulation with some form of ice cooling was desirable, we should have it. If, on the other hand, insulation and ice controlled temperature failed to produce worth while results, taking into consideration not only the cost of construction, but the cost of operation, it would be a fact worth while established for our own benefit and the benefit of others who might be building storage houses.

Our last year's work on apples, where we found 32° a critical temperature, for long term holding, and that even 35° holding did not prevent rapid ripening, made us critical as to the value of 40° as a storage temperature for apples. But in the first place, our last year's work was mainly with Western apples shipped to us by express; our this year's work was to be with our own fruit. Then again we could not be sure that 40° storage right from the time the apples were picked, before they had stood transportation, might not bring them to the end of their storage term in better condition than our cellar stored, uncontrolled temperature fruit.

We knew that our apples softened rapidly. We thought that 40° might possibly lessen the rate of softening. The weight of authority in any event seemed to be in favor of controlled temperature storage — supplemental refrigeration

— so we decided to make a full and complete test. In this test was also involved the question of the proper handling of the crop from the orchard to the storage.

While it has been stated with great emphasis and with great authority that immediate storage was desirable — just as soon as possible after the apples were picked they should go into storage — no distinction has been drawn between cold storage and common storage in this connection. It seemed to us that the storage conditions were so different that what was true in one case might not necessarily hold in the other. Further, as the work has progressed, information has been gathered about the advantages of different methods of ventilation for apple storages, and further data regarding humidity.

Storage Experiments. We had during the year just ended a good crop of Wealthy and Wageners, with a few Northern Spies and Baldwins. We picked of both Wealthys and Wageners something over two thousand bushels each, well grown, well colored, well developed fruit, fairly representing the variety. The trees were young trees, in good condition, the crop abundant for our purpose. There was no reason why we should not be able to obtain reliable information with regard to the storage of these varieties.

We selected Wageners for our test, as it is a variety which keeps well until January or February. Our Wageners matured in storage earlier than usual, as has been the universal experience for last season's apples, and were sold by January 1st, in the markets to which they were shipped at time of picking. They offered, however, a good opportunity for a test of storage.

Our cold storage equipment gave us an opportunity to choose temperatures and storage conditions to simulate those prevailing in the latest type of ice temperature controlled apple storage. We decided on:

1. Storage at 40° without ventilation.
2. Storage at 40° with ventilation.
3. Storage in Cellar.

As a check, and to gain what additional information might be obtainable, we also decided upon:

4. Storage at 32° with recirculation of the air within the storage chamber, occasionally freshening with outside air.

To enable us to test Immediate versus Delayed Storage, in these different conditions we placed apples:

1. Direct from the tree the same day picked.
2. Delayed ten days in the packing room.

To test the value of different commercial packages, we stored in:

1. Ventilated crates.
2. Barrels with heads open.
3. Barrels with heads nailed in place.

Apples were also stored in crates or lug boxes under roof cover in the orchard itself, sheltered from the rays of the sun and from rain, but in the open exposed to the day's heat and night cold.

We also from time to time during the season compared apples picked up from the ground around the trees, with the apples held under controlled conditions.

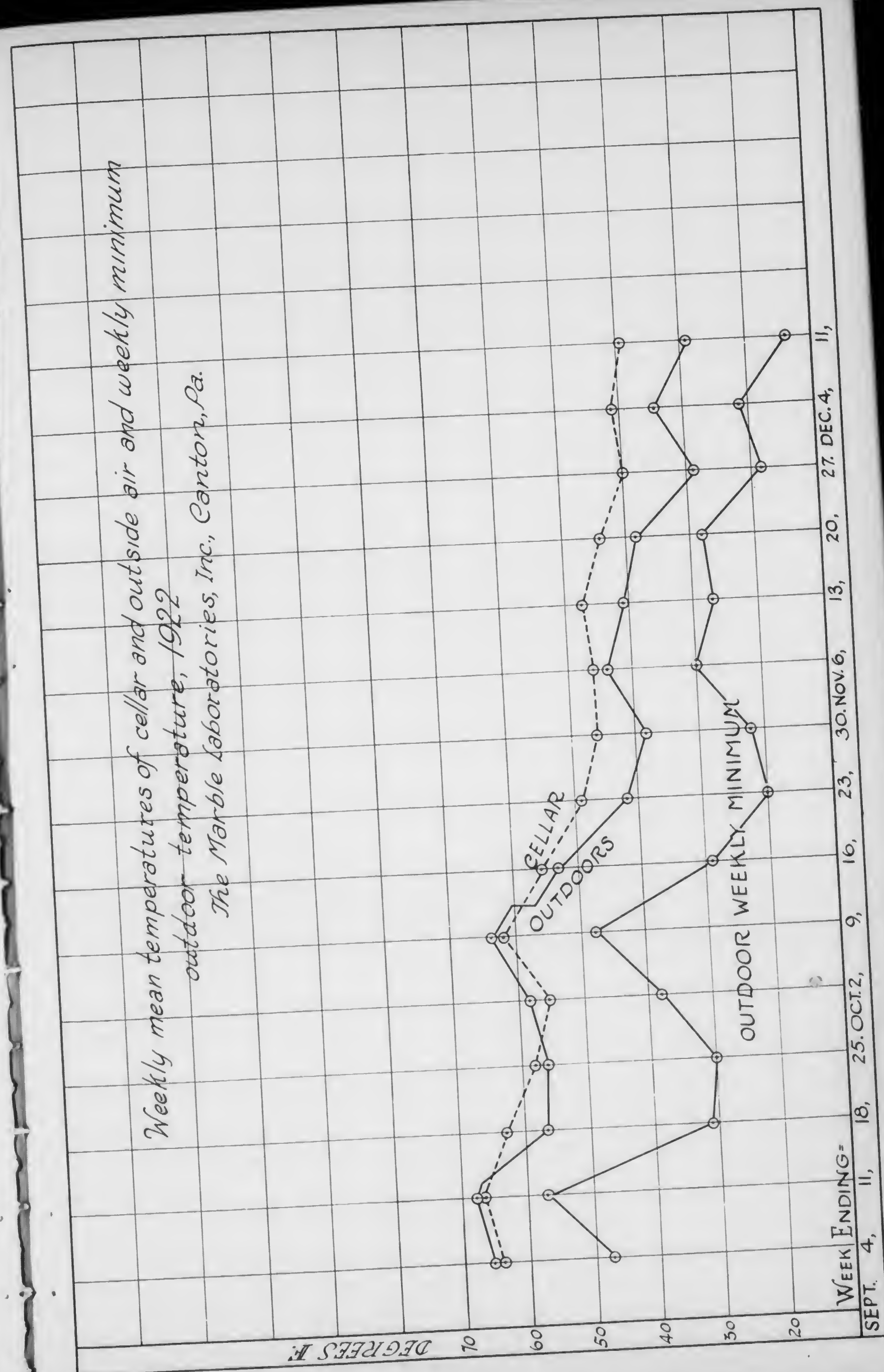
Orchard run apples in the picking crates just as they came from the field and without sorting were used in all the tests.

Temperature Relationship of Storage Cellar to Outside Temperatures During Picking Season and Until Settled Cold Weather

Before we proceed further, let me ask you to consider the temperature relationship of the storage cellar to outside temperatures, during the picking season and on until settled cold weather. This is one of the most important factors determining the effect of cellar storage upon the maturity of the apples stored.

Chart No. 1 gives the weekly mean temperature of cellar and outside air, and weekly minimum outdoor temperature from September 4th, to December 11th. About Sept. 4th, we started picking our Wealthy apples. After December 11th, the temperature of the cellar has been maintained by special ventilation methods with air, around 40°, so that the cellar temperature from this time on is of no interest so far as normal cellar temperature is concerned. It is, however, the temperature at which the apples were being held in the control chamber, and was used for the sake of comparison.

The chart clearly shows that the cellar temperature follows the general temperature of the season, as evidenced by the weekly mean outside temperature, but that it does not respond to sudden drops of outside temperature. The cellar temperature is tempered and greatly influenced by the temperature of the earth and, while the outside air shows great fluctuations, undergoes changes which are only moderate. You will note that in September, during the time of picking for Wealthys, the temperature of the cellar was above the temperature of the outside air, as shown by the weekly mean reading; and that again in October the temperature of the cellar as shown by the same reading, is above the temperature



of the outside air. The minimums of outside temperature were nowhere approached. By December the cellar temperature had been brought to 40° , and from that time on could easily have been held around 35° until the breaking up of the ground in the spring, but for the purpose of this test we preferred to hold it at 40° .

Ventilation of Storage Cellars. A number of small openings as contrasted with one large opening.

Two general methods of ventilation were employed during this period. In bulletins regarding the ventilation of storage cellars, preference is usually given to drawing the air in through a number of smaller openings, evenly distributed around the walls, and forcing the air out through the action of a propellor fan arranged in the outgoing air duct.

To try this method out we installed a 40" diameter propellor fan at the south end of the cellar in the end wall, and arranged the inlet openings so that there were a number of relatively small openings distributed through the storage chamber. The air change was about one change in six minutes, or ten changes per hour. This afforded a marked and perceptible air movement. To our surprise this movement, though large in volume, was not sufficient to make the cellar air feel fresh. It felt stale. We knew that we were not getting the benefit of outside fluctuations of temperature. We felt sure that the Wealthys which were in storage at this time were ripening with undue rapidity by reason of the high temperature of the storage.

As a matter of fact we soon found that the Wealthys in our storage were softer and tasted riper than the drops picked up around the trees. This was noted as early as October 1st, and throughout the entire month of October and on into November, until frost, we could obtain fresher, juicier, better tasting fruit by picking up around the trees, than in the cellar.

Feeling that we should obtain better results with Wageners by improving the ventilation, we cut a large opening 7' x 7' in the north end of our cellar, which stretches from North to South and is 125' long and 25' wide. The opening which we formerly had in the North end of the cellar was blocked off by the cold storage chambers and was not available. With this large opening in the North end, and a 40" propellor fan in the South end, we could compel air movement in large masses, regardless of whether the natural conditions were favorable to draft or not. We thought that we surely would have all the ventilation that was necessary, and we did. The air became fresh at once. The air in the cellar was brisk and invigorating, and the ventilation abundant. The cellar temperature, however, was not as low as we would have liked. We were unable to force it below 45° as a weekly mean during October, despite the fact that outside temperature

dropped to 20° at one time and was for quite a period below 30°. The earth temperature acted to hold the cellar temperature up.

It should be borne in mind that our experience in ventilation related only to Bank Cellars without insulation and without any means for temperature control other than fresh outside air. In insulated constructions, different results would undoubtedly have been obtained.

Discussion of Results

Two methods were employed to determine the results:

1. The hardness of the apples at different periods throughout the storage season, as determined by the Murneek Pressure Tester.

2. The condition of the apples upon withdrawal from storage.

We will first consider:

1. Hardness as Determined by the Murneek Pressure Tester.

The pressure tester used was developed primarily for the Pear industry by Mr. Murneek of the Oregon Agricultural College. It comprises a plunger with a rounded end which is forced a pre-determined distance into an apple. The pressure required to force the plunger into the apple is indicated in a spring scale. The apparatus is simple and gives fairly accurate results.

Five different pickings were employed:

October 3d,
October 5th,
October 7th,
October 13th,
October 24th.

Apples picked on October 3d were just reaching the commercial picking stage.

Apples picked from October 7th to 13th were in prime picking condition.

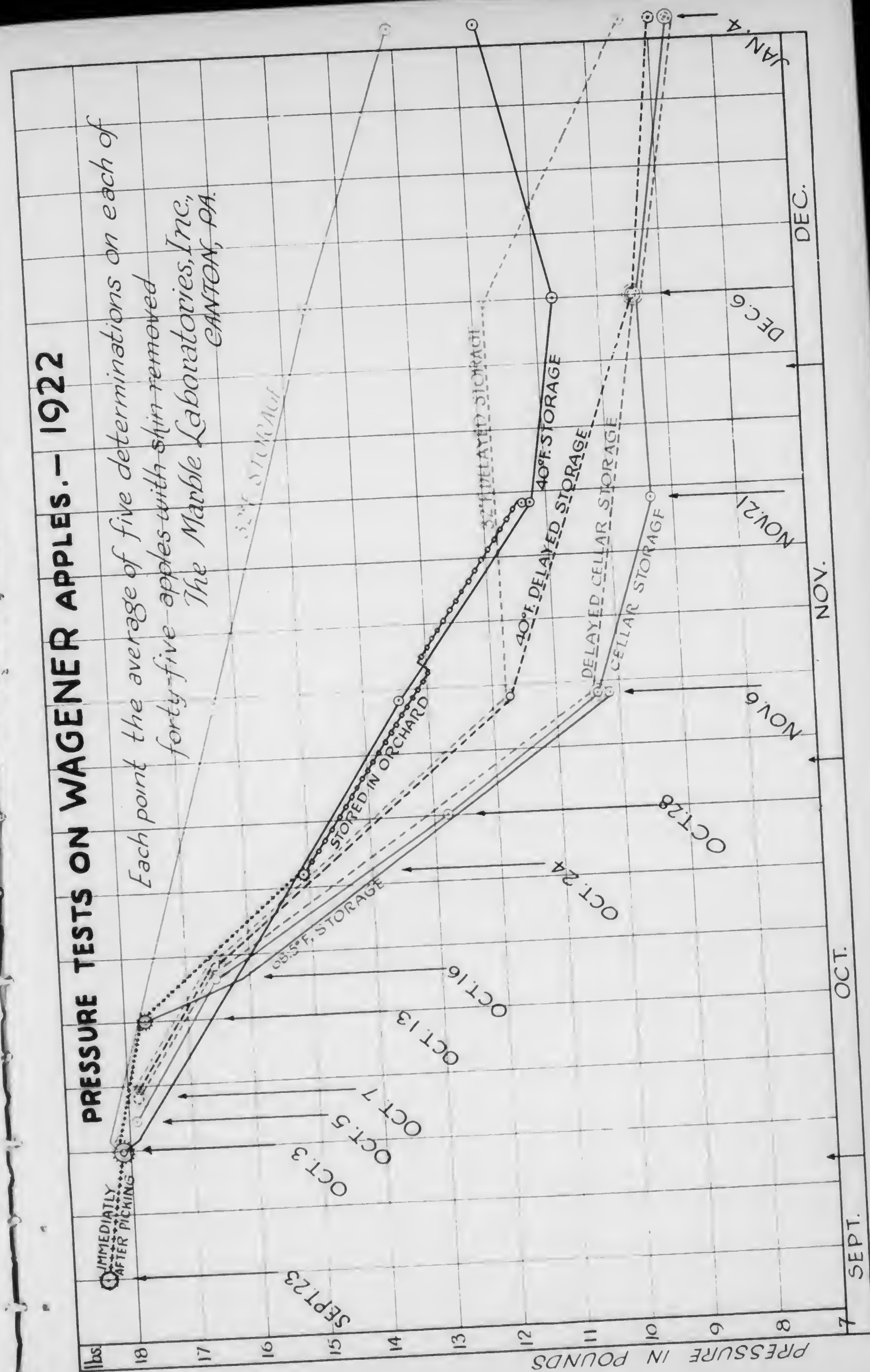
Apples picked on October 24th had been held on the trees as late as possible, just to see how long they could be held, and were ripened by a 20° drop in temperature of a few hours duration during the night of October 23d.

You will see from the chart that:

Cellar stored Wageners had reached full softness by Nov. 6th, or thirty days after picking.

Cellar stored Wageners were as soft on November 6th, as apples held at 68° continuously from time of picking.

The pressure test in both cases is a little over 10 lbs.



Cellar stored apples behave the same when stored immediately after picking as when delayed ten days in the packing room. These Wageners are in excellent condition now. They are fresh tasting, crisp and juicy. They will hold for several weeks yet in about the same condition. They will soften slightly, but not appreciably, as they have already reached full softness.

40° delayed storage apples soften nearly as rapidly as cellar stored apples, and had reached the same degree of softness by December 6th. There is no advantage in storing in 40° delayed storage over cellar storage.

40° immediate storage apples are in much better condition than either the cellar stored fruit or that held in 40° delayed storage.

The reading on January 4th, was slightly higher in hardness than that on December 6th, but this difference is not significant. The tissue of apples after reaching full maturity frequently shows unevenness in hardness.

Orchard Stored Apples. The greatest surprise, however, is that apples held on the trees until October 24th, and then held in the orchard, were actually as hard on November 21st as apples held in 40° immediate storage. They were not only as hard, but they were in better condition, juicier, snappier, better flavored and better fruit.

In other words, our test shows that apples picked late and held in the orchard under roof shelter, are in better storage condition on November 21st, than apples stored immediately after picking in 40°. Unfortunately we lost this fruit in a freeze after November 21st, so that comparison stops at this point.

It is, however, clearly shown that for Wageners at least, late picking, storage in the orchard until cold weather forces inside storage, and then cellar storage — the temperature of the cellar is at this time about 40° — is the proper method for handling the fruit, for apples which are stored at point of production. Fruit destined for distant shipment should be shipped immediately after picking.

32° Storage. While 32° storage does not come within the limits of this paper, it will nevertheless be interesting to know the results obtained at this temperature.

Apples were just as soft on November 6th as apples held in 40° delayed storage, and did not hold as well as the 40° immediate storage fruit. The condition of the 32° delayed storage apples was, however, markedly better than the 40° delayed fruit on December 6th, and while it softened quite a little between December 6th and January 4th, ended the season in good condition.

32° delayed storage apples were softer than 40° immediate storage fruit on November 6th, showing that its initial rate of softening was faster than that of the 40° immediate fruit. The low temperature acted as a check, however, and after the middle of November the 32° delayed storage apples held firmer.

32° immediate storage apples, held until January 15th with very little softening and in perfect condition. It is interesting to note that the rate of ripening of Wagener apples stored at 32° immediate storage is practically the same as the rate of ripening of the apples when held on the tree after maturity. The softening observed in the pickings of:

October 3d,
October 5th,
October 7th,
October 13th,

is almost precisely the same rate of softening as is observed in the apples held until January 4th, which for this year was the end of the commercial period.

Comparable results on storage at 32° immediately after picking have been found with Wealthy in 1921, and were found with Northern Spy this year.

It is clear that there are three stages in the ripening process:

1. An initial change before softening commences which can be checked if the apples are placed in 32° immediately after picking and which, if checked, will greatly delay the usual softening and enable the apples to be held without marked softening long after the usual storage period.

2. A gradual softening, differing for each variety, which can be delayed by storage at 32° but not prevented.

3. A full soft condition which may last for several months, and which does last until physiological breakdown, rots or moulds destroy the fruit.

Immediate storage at 32° not only holds the apples perfectly firm; it preserves the distinct tree taste. The apples are just as if picked from the tree. They have full tartness, full juiciness, the full tang and snap which we so much desire. It is the perfectly stored fruit. It is necessary, however, for the storage at 32° to be continuous. Any break in the temperature, such as rail transportation in refrigerator cars, will start the action of the softening forces, which, once started bring about full softness within a comparative short period.

2. Condition of the Apples Upon Withdrawal from Storage.

The conclusions as to the effectiveness of the different kinds of storage conditions have thus far been based upon the pressure test. We will now consider the condition of the apples

upon removal from storage on January 15th, as shown by Tables I, II and III.

Cellar stored apples in ventilated crates were nearly free from scald; were entirely free from mold; had a negligible percentage of withered fruit, and contained about 90% perfect apples. There was some rot due to physiological breakdown, but an apple touching the rotten apple was not injured.

Cellar stored apples in both closed and open barrels showed some scald, but were perfectly free from mould. There was about the same percentage of rotten apples as in the ventilated crates. There was no withering. Approximately 70% perfect fruit. The open head barrels were freer from rot than the closed head barrels.

The humidity varied widely but much of the time was around 65%.

40° unventilated stored apples were nearly all scalded; nearly all showed mould; had no withered fruit; showed about the same rot as the cellar stored fruit and contained practically no apples absolutely perfect.

The barrel apples were in somewhat better condition than the apples in crates, although the inside of one of the barrels was covered with mould. Open barrels were freer from mould than closed barrels. The mould had not penetrated the apples in any case. It was a white mould, light and feathery and easily removed. The appearance of the fruit was, however, affected.

Humidity varied from 85% to 90%.

40° ventilated stored apples in ventilated crates showed a little scald, but not much, and the scald was light. They showed a considerable amount of mould, which was traceable to the room having been full and insufficient attention having been paid to the crates having free access to the ventilating air. While the room was ventilated with four changes of air per hour, the air was cut off from the crates by the crates being packed in with solid packages to such an extent that the apples were moist, drops of water standing on many of them. There was somewhat more rot than in the cellar and the 40° unventilated room due to the lack of ventilation in crates. The percentage of perfect apples was small.

The 40° ventilated stored apples stored in barrels were badly scalded in the closed barrels, and showed practically no scald in the open barrels. They were badly moulded in the open barrels, and showed practically no mould in the closed barrels. The freedom of the closed barrels from mould was due to the dryness of the package. The open barrels were very moist and showed just the condition suitable for good

growth of mould. The scald in the closed barrels was about the same as the scald in the 40° unventilated room, as was to be expected, as ventilation does not affect the closed barrel and storage conditions were, therefore, similar. The open barrel apples were practically free from scald, the scald being somewhat less than in the ventilated crates.

There was somewhat more rot in the barrel apples than experienced in the other storage conditions, due to the moist condition of the fruit.

The percentage of perfect apples packed in barrels was small, but it should be remembered that the mould in both of the 40° rooms was light, had not penetrated the skin, and would have been removed by storage in dry air with ventilation for a few days. As a matter of fact, the 40° apples from both ventilated and unventilated rooms were stored in the cellar after withdrawal from these rooms, and the mould had entirely disappeared in a week.

Humidity in the 40° ventilated room varied but held around 65% in the open spaces most of the time. Apples themselves were, by reason of the packing conditions, held under high humidity conditions.

32° Storage Apples With Air Circulation were sound and firm and free from mould — in perfect condition. They did not show any scald while in storage nor immediately on withdrawal, but slight scald was noticeable on inspection ten days after withdrawal.

Humidity was around 65%.

Discussion of Ventilation, Humidity and Scald

Ventilation. We draw from this work the conclusion that ventilation is so important to the prompt cooling of apples after picking, and for taking advantage of every cold night and the colder days, that, unless you have available 32° cold storage, the apples should be held in the open, protected from rain and the direct sun, until continued cold compels storage. The season will by that time have advanced to such a point that either above ground or below ground storage will be at suitable temperature. From that time on care must be taken to keep the apples from freezing. They should be held as near 32° as possible for most varieties, but the holding temperature should be regulated in accordance with the requirements of the special varieties being stored.

While during the heat of the day apples in the open will be warmer than if held in a cellar or other form of storage, the advantage of the cold nights more than counter-balances this disadvantage. If stored outside, actual test has shown that they keep harder and in better condition than any other form of storage other than 32° immediate storage.

Continuous ventilation during the storage period is of great assistance in preventing mould when the storage is in open packages and assists in the prevention of scald. For barrel storage ventilation has limited value unless the heads of the barrels are open.

The necessity for unrestricted ventilation during the cooling of the apple after picking and while ventilation is depended upon for controlling the temperature of the apples, will be apparent if the cooling process is considered.

Four apples weigh a pound. They may be considered from the standpoint of cooling as 100% water. That is to say, they require the same cooling effort as cooling one pound of water, the standard on which all cooling calculations are based. To cool four apples, or one pound of water one degree in one hour, takes 1 B. T. U. To effect such cooling by ventilation it is necessary to raise an equivalent weight of air, or a pound of air, 1° in one hour. At ordinary temperatures and humidity it requires 52 cu. ft. of air to weigh a pound. Hence it is necessary to raise 52 cu. ft. of air 1° for each degree of temperature with which you cool each lot of four apples in storage.

When you consider the number of apples in a bushel, the number of bushels in a storage, the difficulty of securing free access to ventilation of all the apples even when held in ventilated crates, the much greater difficulty of securing free access when the apples are held in boxes or open barrels, the amount of air which will be required to effect such a temperature control is enormous. It is clearly beyond ability to provide within the time limits of the problem, even if you had an air temperature always below the temperature of the storage.

But the air temperature is sometimes below the temperature of the storage and sometimes above; the difference between the outside and cellar temperatures is only a few degrees; and other factors affect the temperature of the storage than simply the ventilation air and the apples. So that, even with forced ventilation under the conditions of actual work, it is impossible by ventilation to effect as satisfactory a control of the temperature of apples in storage, as can be effected in the open, where the supply of air is unrestricted.

Actual proven result is in accord with theory on this point.

Humidity.* The humidity of storage must be determined with reference to avoiding growth of rots and moulds. We have seen mould grow at high humidities and die down as the

* It is interesting to note that in the storage of Hubbard Squash at 40° F. in a room with four changes of air per hour, fresh outside air being used, mould persisted at 60% humidity which entirely disappeared when the humidity fell to 45%. It is thus apparent that different degrees of humidity will be required to control mould in accordance with the fruit or vegetable being stored. Mould on apples is entirely controlled at 60% humidity.

humidity has been lowered, and then grow again as the humidity has increased. Control of humidity is essential. There must be no thought of keeping the storage at the same humidity as the air in the intercellular spaces within the apples, and thereby avoiding vapor tension. Water is constantly being evolved and absorbed within the apple tissue by the process of respiration, so that the intercellular air, which changes slowly, must be very high in humidity. Indeed it has been shown that the air in the intercellular spaces is nearly 100% humidity. Even 90% humidity promotes the growth of mould. The air in the 40° unventilated room was at from 85% to 90% humidity most of the time, and here the moulding was bad.

80% humidity is the percentage established by accepted practice as the proper humidity at which apple storages should be held, and we have found nothing to dispute this practice. We will say, however, that the air in the cellar, and in the 32° room had an average humidity around 65%, and that no harmful results were experienced. In the 40° ventilated room the air in the open spaces was also at 65%, but the conditions of the room were such that the apples were actually held under high humidity conditions and so cannot be considered in this discussion, other than as showing that the mere fact that apples are stored in a ventilated room is not sufficient; they must be so stored and arranged that they are exposed to the ventilation current. If sufficient air movement is not provided moisture will gather and mould will be formed and scald is likely to occur on varieties subject to scald.

The danger of low humidity is, of course, that of withering, but we have experienced no withering when the apples have been well blushed, and when the storage has not been prolonged beyond the normal storage period of the variety.

Our conclusion as regards humidity is that the storage should be held at a humidity low enough to prevent formation of mould, and that a humidity as low as 65% is not harmful for apples within the normal storage term for the variety where the apples are well blushed. Partially blushed fruit may shrivel. We do not believe it necessary at the present time for common storage houses to attempt the control of humidity, other than by providing free ventilation with fresh outside air, and we believe that the indiscriminate wetting of the cellar floor must be carefully practiced to avoid mould growths. The apples must be kept dry. If drops of water stand on them, mould will surely follow.

While making this statement we wish to call attention to our reservation that we have found 80% humidity, where it can be obtained, to be best for apple storage. The ventilation air should be dry enough to absorb and carry off any surplus moisture, but not dry enough to produce shriveling.

In cold storage, air movement within the storage is necessary to control humidity. The air currents produced in the ordinary course of refrigeration by the flow of brine through the pipes may in some instances be enough to provide sufficient air movement, but in commercial storage some additional means for air circulation will usually be necessary. Especially is this true during cold weather when the outside temperatures are such that very little refrigeration is required and the flow of brine is very slight. We found that in our 40° unventilated room under these conditions humidity quickly rose and damage resulted.

Recirculation of air within the storage room, if means are provided for controlling the humidity in the air, with occasional freshening of the air, seems to give satisfactory results. Suitable methods for uniform distribution of the ventilating air will enable suitable air movement to be carried on without danger to the products stored.

Scald. There appears to be two distinct factors influencing the occurrence of scald — temperature and ventilation.

Low temperatures appear to have a depressing effect and to lessen the resistance of a given variety to scald.

Ventilation is effective in preventing scald if the temperature is high enough for the variety.

Wageners scald at 32° under air movement, when under the same conditions they do not scald at 40°; while at 40° Wageners stored under ventilation do not scald, while without ventilation the scald percentage is high.

It is well established that soft scald is connected with temperatures under 32°; and that internal browning of the Yellow Newton is connected with storage at temperatures below 36° to 38°.

May it not be worthy of investigation if soft scald, regular scald and internal browning are all manifestations of tissue damage due to low temperatures, and will it not be profitable to study the temperatures at which the different varieties may be held without scald, so that for each variety subject to scald, the critical temperature may be found for that variety, below which scald is apt to occur and above which scald will not be harmful?

Just as we now know that:

Jonathan and Rome Beauty should be stored at 32° and above on account of soft scald;

Yellow Newton should be stored at 38° and above to prevent internal browning;

And now that Wageners should be stored at about 40° and above to avoid regular scald.

May not the critical temperatures for other varieties be likewise capable of determination, and scald be avoided by the use of proper holding temperatures?

In this connection it is interesting to note that it is commercial practice in certain portions of Pennsylvania to store York Imperials at 35° under ventilation to prevent scald, which, experience has shown, will occur if the temperature falls to 32°.

General Conclusions

1. 32° immediate storage is to be recommended for long term holding of apples. The 32° temperature must be continuous from the time of picking, and must not be interrupted by transportation at higher temperatures.

2. When 32° immediate storage is not available, the apples should be held in the open under sufficient shelter to protect from sun and from rain, but in the full sweep of the air until settled cold weather. They should then be moved to storage, which will by this time have been sufficiently cooled by the season.

3. Supplementary refrigeration in the form of ice-cooled temperature controlled rooms is not to be recommended. Effective control of storage conditions can only be obtained by a temperature of 32°, and this can only be supplied by mechanical cold storage.

4. For bank cellar storages, one large ventilation opening, preferably in the side of the storage exposed to the prevailing wind, is to be preferred to numerous small openings. Continuous ventilation throughout the storage season is recommended, some means being provided for tempering the ventilation air during severe cold. The use of a propellor fan in an end wall or main discharge duct is recommended.

5. The humidity of a storage should be low enough to avoid the growth of rots and moulds, but not low enough to cause withering. While we have found nothing to indicate that 80% humidity is not the best practice, 65% humidity has not been harmful for well blushed fruit during the commercial period of the variety.

6. Temperature and ventilation are both factors in scald control. When apples are stored at a suitable temperature for the variety, scald will be practically prevented by ventilation.

TABLE I
40° WITHOUT VENTILATION

	Perfect	Scalded	Mold	Rotten Spots	All Rotten
Crates:					
1.	12	7/8	7/8	5	5
2.		All	All		9
3.		"	"	3	20
4.		"	"	4	10
5.		5/8	1/2	9	1
6.	36	All	3/4	21	6
7.		1/2	3/4	7	1
8.		2 1/4 bu.	1 1/2 bu.	21	24
Closed Bbl.	17	1 1/3 bu.	1 1/2 bu.	23	15
Open Bbl.	12	2 1/2 bu.	1 1/4 bu.	21	11
	28	2 3/4 bu.	1 1/4 bu.	12	18

TABLE II
40° WITH VENTILATION

	Perfect	Scalded	Mold	Rotten Spots	All Rotten
Crates:					
1.	3/4 bu.	1/4	1/4	16	8
2.	37		2/3 bu.	7	9
3.	1/2 bu.	very little	1/2 bu.	10	11
4.	None	1/2 bu.	1/2 bu.	10	10
5.	None	30	18	15	9
6.	25	Some	125	9	15
7.	31	1/3 (58)	1/3 (60)	6	14
8.		7/8	130	7	6
9.		Some	All	8	10
10.	18	30	55	36	24
Closed Bbl.	1/4 bu.	2 1/3 bu.	12	33	28
" "	1/4 bu.	2 1/3 bu.	4	22	26
Open Bbl.	1/2 bu.	15	2 1/8 bu.	38	39
" "	1/2 bu.		2	43	

Some apples with drops of water on them and all damp.
Damp — no drops.
Damp as No. 1, occasionally drops.
Very damp. Water on apples in drops.
Dryest crate examined. 174 apples in bushel.
Fairly dry. 173 apples to bushel.
Drops of water on apples.
Few drops of water on apples.
Not damp.
No dampness.
All apples damp 1/4 way down barrel. Water standing in drops.
Slightly dryer than other barrel, but with drops of water standing on apples 1/8 way down.

TABLE III
BANK STORAGE CELLAR

	Perfect	Scalded	Rotten Spots	All Rotten	Mold
Cellar:					
1 bu. Crate	7/8 bu.	8	3	8	None
1 bu. Crate	7/8 bu.	6	7	6	"
1 bu. Crate	7/8 bu.	9	7	8	"
1 bu. Crate	7/8 bu.	3	2	5	"
1 bbl. Closed	1 1/4 bu.	1 1/4 bu.	29	38	13
1 bbl. Closed	1 1/2 bu.	1 bu.	43	41	6
1 bbl. Open	2 bu.	3/4 bu.	28	12	None
1 bbl. Open	2 1/2 bu.	1/3 bu.	10	22	6

Dr. Fletcher: Have you not a publication on this subject of construction of farm storage houses which you could send to those desiring it?

Mr. Marble: Anyone desiring such a publication can have it by addressing me at Canton, Pa.

Following the presentation of this paper, there was an extended informal discussion of this topic, not recorded by the stenographer.

Thursday afternoon, January 25th

PREVENTING AND REPAIRING APPLE TREE BREAKAGE

PAUL THAYER, Extension Pomologist, Pennsylvania State College

An apple tree is a long time proposition and one that warrants considerable care and effort in giving it the proper structural strength to enable it to support successive bearing crops of fruit.

The great importance of the proper formation of the head of young trees is not always realized. Select three (at the most five) branches for the main limbs, seeing that these are so distributed that when they become six or eight inches in diameter there will still be no crowding. Make sure that the angle of attachment to the tree is one making for strength rather than for weakness. Finally, so prune the young tree as to enable one limb, usually the central one, to gain the ascendancy and become a "modified leader".

The foregoing is the program to be followed in the case of the young tree. The mature tree presents a distinctly different problem. Here it is frequently a case of weak crotches already present and only waiting some unusual strain to destroy or injure the tree. This requires the use of braces, either natural or artificial. When taken in time, frequently two slender branches or water-sprouts can be found on the inside of two opposite limbs. If these are twisted together, especially if there be an abrasion of the contiguous surfaces, these will so unite as to form a living brace connecting the two limbs.

This opportunity is not always afforded, especially in older trees, in which case it is necessary to resort to artificial braces. These usually consist of eyebolts or lag screws made of half inch iron and connected by No. 9 galvanized wire. Fruit growers seem to have a slight preference for the eyebolts. These are easily made by any blacksmith by simply cutting a piece of half-inch rod iron the desired length, turning up one end for an eye, threading the other end and putting on a nut.

In installation, horizontal holes are bored in the limbs at least three feet, and preferably five or six feet above the crotch. If but two limbs are to be tied together the holes should be in a direct line but if three or more limbs are to be connected the holes should all point toward the center of the polygon which they outline. The size of the holes should be such that the eyebolts must be driven or the lag screws twisted into place. If eyebolts are used the nut is usually countersunk through the bark. After the bolts or lags are in place they are connected by No. 9 galvanized wire which is twisted to make it taut.

If three or more limbs are to be braced an iron ring is frequently placed in the centre and the bolts connected with the ring by wire.

The treatment outlined is inexpensive. Good judgment would commend the expenditure of a dollar per tree or less in the preservation of trees that have cost perhaps a dozen years' care to produce and are capable of producing an average annual crop of fifteen or twenty bushels each.

Question: Do you advise the central leader type of tree rather than the open head?

Mr. Thayer: I prefer the modified leader. It is very important to get the trees headed right in the first two or three years, so that we will not have to do severe pruning later and thus delay bearing.

Member: I would like to hear more about the mice proposition. That is serious with us. Something was said yesterday about snakes, but I don't want to resort to anything of that kind.

D. M. Wertz: In Virginia I know one large orchardist who has 10,000 little mouse traps in which he places poison bait for mice. Think of the necessity of any one grower having 10,000 of these traps! Another report is that a man from the Federal Department in Washington had prepared in one district 29 tons of poisoned grain for the growers. It might be well for us to find out what may be going on in our own section.

Mr. Thayer: I know one grower who lost a number of trees by mice girdling them pretty badly, and he bought nursery trees and in-arched them into the eight or ten-year-old trees to save the trees.

J. A. Runk: Dr. Fletcher and I saw an interesting case in Virginia—of an orchard mashed down badly by ice, and I would like to have you call on Dr. Fletcher to tell what was being done there. The whole tops were mashed down.

Dr. Fletcher: These were apple trees trained to the open centre. Hundreds of the scaffold limbs were split down through the trunk and were lying on the ground, hanging by the bark and seemingly beyond repair. Where the repair was made within three weeks after injury, before the wood had dried out, it was successful. The limbs were pulled up with tackle into place, and bolts were put through. Then the strong overhead bracing, with wire, above the crotch was made, and the cracks were covered with grafting wax to exclude the air. The main point of interest is that the open center trees suffered severe damage, and the modified leader trees very little. I am convinced that in this region the modified leader apple tree is best.

WHAT VARIETIES OF PEACHES ARE HARDIEST IN BUD?

H. F. Hershey: It has been our experience that Greensboro is as hardy as any we have, although year before last, when we had the freeze, we had peaches scattered through all varieties, no one variety was totally killed. We probably had a few more Greensboro than some other varieties. Carman is supposed to be hardy in bud, Elberta is supposed to be more tender, but our experience has been that there is not a great deal of difference.

Member: Seven years ago this winter we had severe weather that knocked out the peach crop. The only variety that we had producing that year was Crosby. It produced fruit when the others did not.

Member: Eleven years ago we had a freeze out, and the only peach we had was Alton. We had forty baskets of peaches from one hundred trees. The Alton is considered the hardiest with us.

Paul Thayer: The Fitzgerald peach, of Canada, is called "iron clad," and it will withstand lower temperatures than any other variety. Unfortunately, originating in Canada, while it is hardy against cold weather in winter, it is also one of the worst varieties for spring killing of blossoms.

Question: How about J. H. Hale?

Member: We have 300 trees in the fourth year. We had a few peaches on them, some large and some small. It seems to me on the whole that it is not what it ought to be.

Sheldon Funk: Of J. H. Hale I can say that it freezes readily in winter, but it does not freeze readily in spring.

Member: I planted J. H. Hale the first year it came out; and I have been very much disappointed in them. They have been in bearing four or five years, and I never had but one good crop. This year Elbertas mixed with them had a good crop, and Hale had a slight crop. I had some very nice peaches, but a lot of little ones.

Member: Our experience has been that the Belle of Georgia is the best all around peach both to withstand zero weather and also spring frost. It is also a good commercial peach.

IS FRUIT FARMING WITHOUT HORSES PRACTICABLE?

S. C. Eshelman: We have been using a tractor exclusively for the past four years. We have a hilly proposition, and we found it difficult in the hot summer months to keep horses on the job. Since we have adopted the tractor we do much more work in a shorter time, and there is a great saving of time during the busy season. We keep the tractor moving right along. We do no farming. This may vary somewhat where you farm trees. After four years' work with the tractor we have certainly no intention of going back to horses.

Member: We use a number of tractors, but we find that we cannot discard the horse. Some of the largest concerns in New York and Philadelphia are selling their trucks and putting the horses back, because of the expense involved. I think we can over do the tractor business. I think the horse has its place, and I think the time is not here to substitute all kinds of machines for the horse.

Member: We are getting along well with caterpillar tractors for spraying. We have two men spraying and one man driving, and they slow the tractor down to a crawl, and in the younger orchards we keep going that way.

Mr. Eshelman: It was necessary for us to have four horses in our spray rig, and we found it difficult to get over our orchard even then. Now we have our spray rig on two wheels, throwing two-thirds of the weight on the rear wheels and one third on the tractor. We haul 300 gallons, where we could not haul 200 gallons with four horses.

QUALITY IN NURSERY STOCK, AS A NURSERYMAN SEES IT

MR. HARTMAN, of Heisey Nursery, Greencastle

I will say that two things are essential. A tree should be young, and it should be thrifty. When I say young, I mean not over two years old.

I would want a tree that any man with a knife could train into such a tree as he may desire. There was a time when people wanted very low-headed trees, and a time when they wanted them very high. I sell trees, and let the other fellow trim them. In no case would I advise anybody to plant a tree older than two years. There was a time when lots of orchards were planted with trees six and seven years old. At that time we never dreamed of selling trees less than two years old. Another important thing is to have a tree with a good root.

Three years ago when nursery stock was very scarce a lot of people bought small trees not over two feet, and were suc-

cessful. A one-year-old tree, if strong, and high enough to suit your idea in forming a top, is a good kind of tree to plant. If you have a thrifty tree with a good root regardless of how it is produced, either one or two-year-old, it brings good results. Above all else, try to get them clean, free from disease and pests.

Question: Has not a great deal of nursery stock that we buy been injured by being stored through the winter?

Mr. Hartman: I know it was in the case of some trees that I bought last year. They sent samples that looked good. They said they were dug and in storage. When the time came for me to look at them, they had heated, the bark was loose on many, and I could not use them. If properly kept in storage they should come out in fairly good condition. In our nursery we do not store anything. Everything is left in the ground until we dig it for sale. That is the best way.

VEGETABLES AS A SIDE LINE

SHELDON W. FUNK

Personally, I was interested in vegetables only because I had to be. I grow vegetables as an intercrop, not as a side-line. We never felt we had enough money to cultivate young peaches unless we got a return. The unfortunate part about the vegetable as an intercrop is that in a large orchard you can not use them in all your planting, as they require intensive culture.

Watermelons usually have paid us as well as anything in intercropping. It does not pay to use them the second year because of the pests that attack them. I have seen the striped bugs take up a watermelon and roll it down the hill—they are so plentiful. I have never found anything better as an intercrop than vegetables for peaches. Of course, for apples it is not as necessary to cultivate, as is the case when you are growing peaches.

ARE THERE ANY NEW VARIETIES THAT ARE DISTINCTLY BETTER THAN THE OLD?

PETER BOLTZ

The subject of apples was well discussed by the General Fruit Committee. It makes a considerable difference whether the grower caters to the wholesale market or to the home market. In my home market my customers insist on Baldwin apples, and unless we have them we lose many a sale. It is to our advantage to continue the Baldwin, even though there may be better varieties.

To those of you who are growing Black Twig I suggest that you substitute the Paragon. They appear to be the same apple but I find there is a vast difference in the tree growth. The Paragon is quite prolific, while the reverse is true of the Black Twig. It is a good commercial apple to follow Stayman. It prolongs the season of that type of apple.

If there are any who feel that they want to grow Ben Davis, I would say substitute the Champion. The Champion holds on to the tree remarkably well, and it not only prolongs the season for marketable apples but prolongs the season of picking. We always leave the Paragon and Champion for the last to pick. They are wonderful keepers. They will keep in ordinary storage until quite late. Last August one of my customers came to market with one of my last year's Champion, in a good state of preservation.

The newer varieties of peaches that we have had some success with are Early Elberta and J. H. Hale. In Japanese plums I find that the Early Gold is much the best plum of that kind. It is a yellow plum of good quality and bears well, and it is not as subject to brown rot as some others. We have a good many Kieffer pears in our section, and they are not profitable. I presume because the people know them too well. Bartlett ripens ahead of the Kieffer, and comes in at a time when it is not in competition. Another pear that is grown very extensively in our section is the President Drouard. It is a winter pear. I have no further suggestions, except to say that many plant Early Richmond cherries, but we find Dyehouse pays better.

SHOULD THE USE OF PEACH FILLERS IN APPLE ORCHARDS BE ABANDONED FOR FILLERS OF EARLY VARIETIES OF APPLES?

SHELDON FUNK

I would say, no. In all sections of Pennsylvania where peach growing is a commercial proposition, I would just as soon think of going out of the fruit business as I would think of planting early bearing apple in place of peach fillers. Our experience is that usually a basket of good peaches will bring almost as much money as a bushel of early apples. Another reason why I would not use early apples as fillers is because two of our neighboring states, New Jersey and New York, which we have always considered very serious competitors, have both planted very heavily to early apples, and I believe we are going to find rather a slow market for early apples for the next few years. My experience has been that whenever we get into competition with New Jersey we have trouble in getting the prices we should have.

The only place where I have used early apples as fillers is on a location where the land is too steep to cultivate peaches, or where the land is rather low, where there would be danger of peaches freezing out. I know many will say that there are objections to growing peaches among apples, but personally I have always done it, and I have yet to find objections from my standpoint.

Question: Why not use winter apples as fillers?

Mr. Funk: There are very few varieties with me that would be profitable under eight years, and that is too long to wait.

IS THE GENERAL OUTLOOK BRIGHT FOR FRUIT GROWERS?

C. J. TYSON, Flora Dale

I am not going to undertake to make a prophecy that may be thrown back at me five or ten years from now, but you will probably forget it before that time. Many of you heard Professor Agee the other night, and caught his feeling of optimism, that agriculture had a better time ahead. You probably all feel that after the past three years, that we are bound to have a better time, because it has been just as bad as it could be. To a certain extent, this is true, but we were spoiled. In the early years of the war we went through a period of inflation, which created a condition of mind that was a tumult. In 1920 we suffered the results of that inflation — a large crop, a drop in price, and exceedingly high production costs, so that the man who made money from that crop was rare. Throughout most of this territory we had a freeze in 1921. To some extent the same thing happened the past year together with unusual disease attack.

Comparative Prices. I have a compilation of comparative prices of York Imperial apples. At a certain time this season they were bringing about \$3.00 a barrel, at the same time during the past sixteen years they have brought an average of \$3.30 a barrel, over the sixteen years. In fifteen years, leaving out the year 1919, when prices were extremely high, the average was practically the same as this year. For the ten years prior to 1917, the price was \$2.16. As far as prices are concerned, while we have been through a bad year, it proves comparable with some of our good years. Of course, production costs have still been too high, and that is one condition which will have to improve if the fruit grower is going to be satisfied in the future. Labor, freight and supplies will have to come to us at lower prices.

There is another side to this proposition. With industrial prosperity throughout the country, which in itself is likely to mean higher labor prices, we are always bound to have better markets for our fruit, so that with the industrial prosperity which many of our good prophets tell us is ahead, we can expect fairly good markets.

Increase in Consumption. The actual consumption of fruit today as compared with ten or fifteen years ago is another favorable point. Ten years ago York Imperials from our southern section went for export, or only to comparatively large markets. For the past few years, and particularly in 1920, 1921 and 1922, I suppose that fifty per cent of the crop has gone to markets that would consume only from one to three carloads of apples in a week, and in many places have gone to smaller markets, where they would only buy one car load in a season. In other words, the practice of buying apples in carloads for consumption in the small towns has greatly increased, so that we have seen the consumption of perhaps the largest apple crop on record at anything but disastrous prices compared with some of the heavy crops of the past.

Advantages of Pennsylvania. The industry in Pennsylvania has so many advantages that if there is to be any fruit industry anywhere, it certainly is going to be right here. We have nearby markets. This means a great saving in transportation and better condition of the fruit. The larger commercial districts of Pennsylvania have the rare advantage of nearness of the sea board lines, nearness to large markets, and the ease with which they can get fruit into export trade.

Varieties grown here are well established on large markets and need no propaganda to keep them going. Throughout this whole district, not only in the large commercial districts, but also in scattered portions of the state, the opportunity to sell low grades is a rare advantage. Our numerous canneries, cider plants, etc., are also great advantages.

We have also many advantages in production costs and operation costs over other districts; as compared with the Northwest, for instance. No fruit is grown in that country without irrigation, and they have an all-season fight against the codling moth. The condition of their market is such that if an apple receives a few stings the fruit must go into a lower grade. That makes an expensive operation of which we know nothing.

In the Middle West they have many diseases which so far we have been free from, or nearly so. Apple blotch, which attacks only a few varieties here, and has not been so very serious, is a constant trouble there. Some of the cankers, that have put thousands of trees out of business, have not been particularly serious here. So that we have a lot of advantages

that would make it look as though Pennsylvania has a fair chance if any state has.

I think we can say that while Pennsylvania fruitgrowing will not be a get-rich-quick proposition in the future, any more than in the past; at the same time we have a right to expect satisfactory results if we do our part well.

IS THERE AN OPPORTUNITY FOR COMMERCIAL PEAR CULTURE IN PENNSYLVANIA?

HOWARD A. CHASE

I have no data on which to make an estimate of the present production and consumption of pears in this state but were I twenty years younger I would seriously consider planting pear trees instead of apple trees. Pear blight, or fire blight, is a formidable enemy but this can be overcome. Select land with good natural drainage — do not manure in midsummer and use the knife and saw freely if the blight appears. Cultivate so as to maintain only a moderate growth. As to varieties, I would plant chiefly Bartlett, Seckel and Kieffer. In a Bartlett block I would plant every fifth or seventh row with Anjou to secure a perfect pollination of the Bartlett. This will give a fully developed pear and make the trees more productive. There may be other varieties as desirable as Anjou for this purpose but I have yet to find them. Bartlett is not as hardy in wood as the other varieties and the trees should be carefully examined before planting to make sure that there are no black hearts, the result of previous winter injury. Pear Psylla is a formidable insect pest but spraying will control it. In conclusion, plant pears — not "for our heirs", but to give us profitable returns.

S. R. Huey: In behalf of the fruit growers of Lawrence County I would like to extend an invitation to the Horticultural Association to meet there this year.

Pres. Griest: In behalf of the Society I wish to thank you, and the invitation will be referred to the Executive Committee for their action.

IS THE SAN JOSE SCALE COMING BACK?

Willis Hess: The San Jose Scale seems to be returning. We experienced one plague of this pest, and now even after careful spraying I understand that in spite of all efforts, there seems to be a return of it.

Paul Thayer: Those troubles come in waves, and I believe there is a wave due. In Illinois it is as bad as it was many

years ago, and they are taking up oil spraying. I think we had better get ready to meet the scale, for it is coming back.

Question: What is a recurrence? Is it because the man has not been paying attention to this job of spraying?

Willis Hess: In the case that I speak of the orchards have been sprayed regularly, and in spite of that practice and the use of spray materials that are supposed to control it, it is gradually coming back. We may be able to do just a little better job of spraying, but what of the orchards around us that are not sprayed, and the pests that come visiting?

Question: Is it safe to spray with oil sprays?

Peter Boltz: I sprayed my orchard with lime-sulphur, and I discovered last year an apple tree that had considerable scale on it, and it seemed in a dangerous condition. I then used "Scalecide," and the trees were apparently cleared of scale, and without any injury whatever. It was applied in the early spring before the buds started.

Member: I use "Scalecide." I have used it for the last four years, and I find it much better than lime-sulphur. It is rather hard to spray and hit every part with lime-sulphur. It dries where you put it. "Scalecide" will run, and it covers the missed spot more easily. I sprayed for several years with lime-sulphur, and never got my trees as clean as with "Scalecide."

Pres. Griest: So far as the safety of oils is concerned, I think if properly applied they are safe; if they were not, the manufacturers would soon be put out of business. There may be cases where the failure of the material to give results lies in faulty application.

EXPERIMENTS WITH DUST ON APPLE*

S. W. FROST, State College

As far as insect control is concerned, the experiments conducted at the State College Research Laboratory at Arendtsville, Pa., bear out very closely the observations made at other experiment stations. One must remember that there are two types of insects, demanding different material for their control; the chewing insects, as the codling-moth and the leaf-rollers, and the sucking insects, as the red-bug and the red-spider.

Nearly every one agrees that the codling-moth and leaf-roller can be controlled satisfactorily by means of Sulphur-lead dusts. The experiments we have conducted over a period

*These two papers by Mr. Frost were discussed at the Wednesday morning meeting.

of five years show that dust applications have given equally as good control as the spray applications.

For the sucking insects, some form of sulphur or nicotine must be used. It has been found that the red-bugs succumb very readily to nicotine dust and excellent control has been affected with a dust consisting of lime and 3% nicotine sulphate. This is a special dust intended for red-bugs and aphids and is manufactured by various companies under different trade names. Prof. P. J. Parrot of Geneva, N. Y. reports good control with reground tobacco dust. Such tobacco must be reground so that it will pass a 200 mesh screen. There is no doubt that under favorable conditions red-bugs can be easily controlled with the proper dust. High winds, cool, damp days should be avoided. Thoroughness is more necessary here than in any other part of the dusting program.

The following tables give an idea of the value of dust in the control of red-bugs. Here the dusting was done under the most favorable conditions. Large white sheets were placed under the trees to catch the red-bugs as they fell from the trees after the application of dusts and sprays. The live red-bugs were then brought down by shaking the trees.

RED-BUG CONTROL, WALTER ORCHARD (Adams County, Pa.)

Date of Application	Material	Live Red-bugs	Dead Red-bugs
May 10	Lime, 2% Nicotine Dust	3	72
May 10	Lime, 2% Nicotine Dust	0	62
May 16	Black leaf 40	0	27

ESHELMAN ORCHARD (Adams County, Pa.)

Material	Live Red-bugs	Dead Red-bugs	Notes
Lime, 2%			
Nicotine dust	5	141	No wind
"	4	21	" "
"	0	113	" "
"	3	57	Strong wind
"	24	47	" "
"	0	69	Received nicotine in the petal spray
"	0	4	" " "
"	0	23	" " "
CHECK	171	0	
	131	0	
	125	0	This plat received no nicotine in any form
	79	0	

RICE SMITH HUBER ORCHARD (Adams County, Pa.)

Material	Live Red-bugs	Dead Red-bugs	Notes
Lime, 2%	1	142	
Nicotine dust	1	166	No nicotine previously used
Lime-sulphur	0	16	
Black leaf 40	0	18	Nicotine was used in the petal spray
	0	6	
CHECK	36	0	
	4	0	No nicotine used in any of the applications
	14	0	

The control of aphids on apple is more difficult than that of the red-bugs. Much more satisfactory control has been effected with spray applications.

As to red-spider control, sulphur dust has been found unsatisfactory. During four years of experimentation at the Arendtsville laboratory we have not succeeded in obtaining control by dusting. On the other hand, liquid lime-sulphur has given good results. Peach suffers as well as apple and at present we have no recommendations for controlling the red-spider on peach.

The dusting situation resolves itself, therefore, into a matter of consideration for the pathologist. The entomologist is ready to recommend dust for the control of codling-moth, leaf-roller and red-bug. For scale insects and red-spider, spray applications must be used until dusting has been better perfected.

LATE FEEDING WORMS

S. W. FROST, State College

A word of explanation is imperative concerning the late feeding worms. Attention has already been called at previous Horticultural and farmers' meetings to the late injury produced on apples. This, it has been pointed out, is due to several species of leaf-rollers. While many species are involved, however, one is more abundant than the rest and is accountable for the greatest amount of the injury. This one is known as the Red-banded Leaf-roller.* It is very abundant in Pennsylvania and is an exceedingly injurious insect. In Adams and Franklin counties considerable injury has been noted especially on York imperial. In some places the percentage of injury has run as high as 50%. Fruit growers and fruit packers agree that a better means of control is needed for this insect.

**Eulia volutinana* Walker.

During the past years it has been found that the life history of this insect is radically different from the fruit tree leaf-roller that appears to be more serious in other states. Previous recommendations for the control of leaf-roller have been based on our knowledge of the fruit tree leaf-roller but it has been found that the difference in the life histories of the two species makes it impossible to control both in the same manner. The old recommendation of spraying in the Delayed Dormant for leaf-roller will not hold for conditions in Pennsylvania because the red-banded leaf-roller does not become active in the spring and lay their eggs until a considerable period after the application of the Delayed Dormant spray.

The red-banded leaf-roller further differs from the fruit tree leaf-roller in that it has three broods a year while the fruit tree leaf-roller has but one brood. With each brood the number of worms increase until by fall they are very numerous. It is this third or last brood that does the most of the injury to the fruit. The last brood is much longer than the rest, lasting until after the fruit is picked. The activities of this worm are most noticeable at the time one is picking the fruit and they are often picked with the fruit and placed in barrels or boxes where they continue their feeding on other fruits.

The red-banded leaf-roller has also been found injurious on peach. It makes the same characteristic shallow feeding scars on the peach.

No definite recommendations can at present be made for the control of the red-banded leaf-roller. The regular spraying program consisting of the Pink Petal spray, 10 Day spray and the summer spray help to keep this pest in control. Still certain orchards that have been well cared for and well sprayed show 30% of the fruit injured by these worms. The work of the past summer shows that late summer applications of spray or dust are valuable and it promises that an application during the middle or first of September may be of great value in cutting down the percentage of injury by these worms. A dust would be more valuable than a spray as the latter would stain the fruit.

MISCELLANEOUS QUESTIONS AND DISCUSSIONS

ROADSIDE MARKETS

L. H. CROSMAN, Oaks

A year ago, in Montgomery County, we incorporated the Pennsylvania Fruit Packing and Sales Company, with a view to cooperative purchasing of orchard supplies, and sale of our fruit. The membership represents about one thousand acres of orchard of various ages.

Situated as we are in a densely populated region, sprinkled thickly with busy manufacturing towns, with a great deal of automobile traffic along our main roads, we decided to establish booths along the road at various strategic points. The fruit was arranged to make a large display to catch the eye, as we found that a small display was of little value. The larger the display, the larger the crowd of buyers.

Crowd psychology was well illustrated many times; when one car stopped to ask the price, others would do the same, until there were at times six or eight cars parked in front of a booth. When no car was buying, or pricing, others were inclined to pass by, but as soon as one car stopped, others followed suit.

The booths were mostly in charge of women, who received 10% of the gross sales for their time.

A daily trip was made from our central packing house to supply the booths, set the price, and to collect the money from sales.

We were much pleased with the result of selling perishable fruit in this way. Comparatively few apples were sold in this manner, except summer apples. Apparently the public still likes to buy its winter apples in small quantities at the grocery or fruit store as needed.

WHAT IS MEANT BY LONG PRUNING?

R. D. ANTHONY

Until very recently apples, and pears, and peaches in California were heavily pruned each year. In the last three years investigations have proved that this heavy pruning has been dwarfing the trees and cutting down yields and, in place of the "short" pruning, "long" pruning is recommended. It means much the same as "little pruning" does in this state.

SHOULD YOUNG APPLE TREES BE PRUNED TO OPEN CENTERS OR TO CENTRAL LEADERS?

R. D. ANTHONY

Central leader trees frequently become too high for easy spraying and picking. In the last few years thousands of open center trees have been broken down by ice. Excellent results have been secured by combining the advantages of the two systems, starting the tree with a central leader and when the framework branches occupy a space along the leader of from five to six feet, the leader is then cut out and from this point the tree is carried as an open centre tree.

HAS SWEET CLOVER A PLACE IN THE SOD ORCHARD?

R. D. ANTHONY

J. M. Weaver of York County reports excellent success in building up poor soil by growing sweet clover. Hubam or annual sweet clover has not been tried to any extent in this state. Even with the biennial form which is used, several growers report that they have been able to plan their cuttings in such a way as to permit enough seed to form to reseed the stand.

WHAT ARE THE FOUR MOST PROMISING APPLES FOR BOXING IN SOUTHEASTERN PENNSYLVANIA

R. D. ANTHONY

It is easy to decide on three — Stayman, Jonathan and Grimes. These have the attractive appearance and the good quality needed in a box apple. The choice of the fourth would depend on a number of circumstances. If a fall apple is wanted, Smokehouse would fill the bill, with Delicious following. For a baking apple for restaurants, it might pay to box Rome for the February and March trade.

ARE THERE ANY NEW VARIETIES THAT ARE BETTER THAN THE OLD?

H. L. BREIDENBACH

On the subject of new varieties my observation during the past season has been limited to one variety — the Golden Delicious. This fruited on four-year-old trees.

Its size was very large; shape oblong conic, somewhat similar to the Delicious but without the pronounced nodes at

the calyx end; color about like the Grimes; skin rougher. The trees bore well.

As to season — it had to be picked somewhat earlier than the Grimes and seemed to ripen up earlier in common storage. As to quality, good; possibly would be pronounced very good by many if considered as a dessert apple only. However, its texture is not as fine as Grimes and it lacks that certain degree of acidity for which the Grimes is noted and which makes the latter an excellent general purpose apple — either for dessert or for culinary use.

To sum up — the Golden Delicious, like the Delicious, is more of a dessert than a general purpose apple; its flavor is appealing; its bearing qualities and size good; it seems hardy in bud (a two year old graft last year bore a few apples); and, although its shape is somewhat against it for barreling, it would seem to have a future in commercial orcharding.

APPLE FRUIT SPOTS

W. A. McCUBBIN

State Bureau of Plant Industry, Harrisburg

The various types of fruit spots on apples are of importance not only because of the actual damage caused to the fruit tissues, but because the disfigurement of the fruit materially affects the sale value. It is convenient to group these spots according to their cause since control is so frequently dependent on a knowledge of the manner in which the spotting is brought about. From this point of view we may consider three types of apple fruit spots, — (1) Spots due to organisms; (2) Spots due to orchard conditions; and (3) Storage spots.

Brooks Spot. (1) The type of spot caused by parasitic organisms is represented in Pennsylvania by but one outstanding case, the injury known as New Hampshire Fruit Spot, the Brooks Spot, or New England Fruit Spot. This is caused by a fungus (*Phoma pomi* Passer) which winters on fallen fruit and sends spores to the new fruit in May and June. Since the fungus is a slow growing parasite the spots may not become visible for weeks after inoculation and may even not develop until the fruit is in storage. Two sprays in the susceptible period will control this spot satisfactorily and since the calyx spray and the subsequent spray two to three weeks later come at about the right time the ordinary scab control series will take care of this fruit spot also.

Baldwin Spot. (2) Of the spots which are not of parasitic origin but are regarded as due to orchard conditions the most

important is the Baldwin Spot, or stippen, which affects besides the Baldwin, the Northern Spy, Tompkins King, Rhode Island Greening, Black Twig and other varieties.

It may be distinguished from other spots by the fact that the areas of dead tissue occur not only on the surface as in other spots but all through the flesh, and further by the bitter taste of the flesh so affected, whence has come another name, bitter pit. The cause of Baldwin Spot is still in doubt though the numerous observations and experiments point to irregular or unbalanced water supply during the growing period as the chief factor. Since rainfall and drought are beyond control the orchardist can only regulate his culture methods so as to insure as far as possible a uniform water and food supply.

The Jonathan, Oesopus, Wealthy, Grimes, Smokehouse, and some other varieties frequently develop a brown superficial spot in the orchard which may increase seriously in shipment and storage. The cause has never been determined with certainty but it is known that it is more severe after a dry summer, that fruit remaining too long on the tree will be more seriously affected, and that poor storage is favorable to this spot. Picking promptly at maturity, followed by quick sale or immediate cold storage are means suggested to lessen loss from Jonathan Spot.

Several varieties, particularly the York Imperial, are affected in some seasons by sunken areas under which there are irregular dark flesh spots. While the cause of this York Spot, as it is called, is not certainly known it is usually attributed to drought conditions in summer and for this reason it is sometimes called the drought spot. It is thought to be related in cause to the Baldwin Spot, and its control would thus be a matter of constant and adequate water supply.

Storage Spots. (3) Of the spots developing in storage mention should be made of both Baldwin and Jonathan Spots, both of which are likely to be accentuated under unfavorable storage conditions. The apple should be kept at a temperature fairly close to the freezing point, with plenty of ventilation, in air containing considerable moisture but not enough to cause deposition on the fruit. Cold storage is best from the point of view of spot prevention.

Spots may arise in storage from ammonia diffusing from leaky pipes, or from other similar gases when the ventilation is not sufficient, but by far the greatest development of storage spots in apples in Pennsylvania is due to the average conditions of cellar storage. Here the apples are piled deeply without provision for slow but constant change of air; the temperature is usually too high and too variable and the moisture content such that with every drop and rise in temperature a film of water is deposited on the fruit. Under such warm conditions the internal chemical changes in the fruit proceed

rapidly and since the stagnant air can not remove gases given off in these processes, the fruit literally poisons itself, just as much as would several human beings kept in a closed room for some time. The result is that at certain points these poisonous gases penetrate into the flesh by way of the breathing pores and the tissues are killed and turn brown thus forming the storage spots so prevalent on cellar stored fruit in spring. The toxic action of these pent in gases may be so extensive as to kill large areas of the flesh just under the skin and a scald results. Needless to say the spotted and scalded fruit is extremely liable to attack by rot organisms.

Storage spots and scalds due to the above conditions are readily avoided. With the temperature kept as near the frost line as can safely be done, and ample provision made for ventilation of the fruit by slatted walls, storage in crates or small containers, the use of ventilating shafts or opened windows, apples will keep well without storage spotting well into the spring.

REPORT OF CONFERENCE ON FRUIT MARKETING

S. W. FLETCHER

On February 20th and 21st, there was held in Harrisburg a Conference on Marketing, called by Governor Pinchot and Secretary of Agriculture Willits. The primary purpose of the Conference was to outline a state wide program for the more efficient marketing of agricultural products. About thirty of the 200 present were fruit growers. President C. Arthur Greist, of the State Horticultural Association, presided at the Fruit meeting, and S. W. Fletcher acted as Secretary. Following is the Committee report:

The outstanding fact in Pennsylvania fruit growing is the number and excellence of our local markets. It is good business to develop and exploit these as far as possible. At the present time, however, more than half of the fruit consumed in Pennsylvania cities, even of varieties that could be produced here, is shipped from other states. Last year over 7,000 cars of apples were unloaded in fifteen Pennsylvania cities, coming mainly from the states of Washington and New York. This is a great and needless loss to the state; practically all of those apples could have been grown within our own borders to even greater perfection and at a lower cost of production. The biggest problem in Pennsylvania fruit growing is how to conserve Pennsylvania markets for Pennsylvania fruit.

Promulgation of Apple Grades. The solution of this problem is in a standardized pack and in publicity. We do not need to fear the competition of any other state as to quality

of fruit or cost of production. Our chief, and practically our only handicap, is the lack of standard grades and a standardized pack, such as our western competitors have had for years, and our northern competitors are now beginning to adopt. There are no standard grades for Pennsylvania fruit today. We recommend, therefore, as the first step in the marketing program, that the Secretary of Agriculture be requested to promulgate the grades that the State Department of Agriculture has given a preliminary trial the past four years; and that he take such measures as may secure for them full educational publicity throughout the state, more especially by holding grading and packing schools and demonstrations in all the important centers of fruit production. The advantages of conforming to standard grades are as evident in the local markets as in the wholesale markets of the state. Good grading promotes confidence and stimulates demand, whether the fruit is sold by the car-load, in barrels, or by the bushel, in open crates.

Publicity Campaign. After grades that mean something are established, and our growers have begun to conform to them as a matter of self interest, then we shall need a comprehensive program of publicity in behalf of home grown fruit. The purpose should be to educate the citizens of Pennsylvania to prefer Pennsylvania fruit, not merely as a matter of state loyalty, but chiefly as a matter of self-interest; for we can say quite truthfully, that it has a flavor that is lacking in the product of most of our competitors. The consuming public should know the distinguishing qualities and relative merits of our Baldwin, Spy, Stayman, Grimes, York, and other standard Pennsylvania varieties; the best uses to which each may be put, and when each is in season. The ordinary means of publicity — newspapers, posters, demonstrations — will be useful here, not forgetting, however, that the best publicity for any article is a satisfied customer. This should be a state-wide campaign, under the direction of the State Bureau of Markets, with the cooperation of the Extension Service of State College, the State Horticultural Association and other agencies.

Cooperative Packing. The time is ripe for more cooperation in Pennsylvania fruit growing, to achieve these goals of standardization of pack and increased consumption through publicity. In the wholesale districts of the state, especially where orchards are close together, this may be secured to best advantage by the organization of cooperative central packing house associations. Several of these already are in operation or are projected. Central packing houses also are practicable near some of our local markets. They give greater uniformity of grade and assurance of volume than can be expected from unsupervised private packing houses, and to that extent tend to stabilize the industry. The organization of

cooperative central packing house associations should be one of the most important developments of Pennsylvania fruit growing during the next ten years.

The Committee also passed resolutions recommending:

1. That it is not expedient to promulgate standard grades for peaches until after at least one more season of preliminary trial.

2. That steps be taken by the State Horticultural Association and other educational agencies to advise prospective planters to reduce the number of varieties planted, especially in the wholesale districts.

3. That the Conference goes on record as asking for a definitely planned program of agricultural research with adequate appropriations from the State Legislature to support it.

4. That it is the sense of this conference committee that rabbits, deer, pheasants, or other game animals or birds, that are injurious to fruit trees or small fruit crops, shall not be liberated or introduced by the Game Commission into communities where they will be injurious to the growers of fruit, and that where such game animals or birds are causing damage to the fruit growing industry, the Game Commission shall take steps to protect this industry.

5. That the buzzard, the red-tailed hawk, the red-shouldered hawk, the broad-winged hawk, the marsh hawk, the rough-legged hawk, the great gray owl, the snowy owl, and the hawk owl, which are not now protected by law, are very beneficial and valuable to all agricultural interests in the control of mice and other small rodents, and are not harmful to poultry: therefore,

BE IT RESOLVED, That all the birds on the foregoing list be protected by law.

6. That we commend the services rendered to the fruit industry of the state by the Bureau of Plant Industry in the inspection of orchards for the eradication of Peach Yellows, and we recommend that this work be continued and extended.

7. That the Conference has been of distinct value to the fruit growers in attendance, and we stand ready to cooperate with the Secretary of Agriculture in case he should deem it wise to call us together again.

Discussion. Following are some of the points brought out by the different speakers, in the course of the discussion:

Ralph Clayberger, Philadelphia. The number of cars of Northwestern apples on the Philadelphia market is increasing each year. This is mainly because of the better pack. There is no waste; all the apples are the same. Pennsylvania fruit

is discounted at once; the dealers know there will be some loss. The consumers, however, prefer home grown fruit because it has a better flavor. Some Virginia apples in boxes bring a higher price than Northwestern apples. The fundamental problem for Pennsylvania growers is to standardize the pack.

J. A. Runk, Huntingdon. The success of cooperative marketing depends, first of all, on the production of a superior article. Marketing is not one thing and production another; the two are inter-dependent. We have paid too little attention in Pennsylvania to what our markets prefer, especially in the selection of varieties.

J. F. Walker, Westtown. We have the beginning of a cooperative association in Chester County — ten men, too widely scattered, we think, to make a central packing house practicable. We are, however, cooperating in buying supplies, advertising, and now we are talking about cooperation in developing the local market, instead of competing with each other on it. Is it necessary to box eastern apples?

Ralph Clayberger. Absolutely not. The same grade will sell for as much, or more, in barrels or baskets. It is difficult to interest the public in an unusual pack, and they expect eastern apples to come in barrels or baskets. The round bottom bushel basket is rapidly becoming standard; hampers are not used much.

W. C. Lynn, Bureau of Markets. The proposed Pennsylvania apple grades are practically the same as the U. S. standard grades, and differ only slightly from the standard grades adopted by Virginia, West Virginia and Maryland. These four states should get together on uniform grades, especially for the York Imperial and Stayman.

W. C. Grove, York Springs. I lost twenty-five cents a barrel on a shipment last fall because Pennsylvania has not established legal grades for apples, although the fruit did conform to the requirements of the proposed A grade. These proposed grades are satisfactory and should be promulgated and made legal.

J. F. Walker, Westtown. We want standard grades for peaches in Chester County. We are handicapped in selling in competition with New Jersey and New York growers, who use the U. S. standard peach grades.

P. R. Taylor, Bureau of Markets. It is not likely that there could be any general enforcement of standard peach grades, if adopted, except in the car-lot shipping districts. There

would be inspection at centers of production, as Biglerville and St. Thomas, but it would be impracticable to institute inspection in local markets; in these, enforcement will be in the hands of the buyers who get stung. These grades would apply only to closed packages.

Chas. H. Hayes, Northeast. Are there any standard grades for grapes? We need them in Erie County.

Paul Thayer, State College. Michigan grape growers have begun to grade, at their cooperative packing houses. But no definite grades have been defined as yet.

W. E. Grove, York Springs. We need to reduce the number of varieties of apples. Northwestern growers have gotten down to about a dozen; Michigan growers have adopted a select list. I should like to see the State Horticultural Association start a campaign of education along this line.

W. L. Minnich, Waynesboro. Every community producing 10,000 to 15,000 barrels of apples, within a radius of six or seven miles from the shipping point, should put up a central packing house. Ours at Biglerville has gained in popularity from the beginning, seven years ago, until now we have a waiting list, and growers from other sections of the county are asking us to operate branch houses. We are a corporation, not a cooperative association, and believe our plan is better, although the method of operation is practically the same. The chief advantage of incorporation is that you get more centralized authority; in cooperative packing associations there are too many fingers in the pie.

R. T. Criswell, Chambersburg. I had an interview with the Game Commission today on behalf of the State Horticultural Association and protested against the importation of rabbits to distribute in counties where fruit growing is an important industry. Commissioner Gordon said there are 500,000 sportsmen in Pennsylvania, whose interests are to be regarded as well as those of the fruit growers. The Commission plans to distribute many thousands of rabbits, and it has the authority to do so.

D. W. Atkinson, Wycombe. A bill prepared by the Game Commission is now before the Game Committee of the House. This is a revision of the game laws. It is a distinct improvement on the existing law, in that it does give some protection to the fruit grower who suffers damage from deer, rabbits, and other game. The disbudding of trees by grouse is not covered, however. Another mistake is that the woodchuck is on the protected list.

The legislative committee of the State Horticultural Association, P. S. Fenstermacher, Allentown, Chairman, was asked to appear before the Game Committee in behalf of the fruit interests.

J. A. Runk, Huntingdon. The methods by which fruit crop estimates are gathered, tabulated and reported are harmful to the industry. They magnify the commercial crop and give the dealer the whip hand over the grower.

P. R. Taylor, Bureau of Markets. A large percentage of the trouble is due to the newspaper headlines, which pick out and magnify certain features. The real trouble is the difficulty of getting at the proportion of commercial crop to total crop. The situation will be greatly improved in Pennsylvania now that statistics are to be taken in cooperation with commercial growers, and for each of the leading commercial varieties.

L. H. Wible, Bureau of Statistics. The statistics in Pennsylvania will be much more satisfactory next year. Heretofore, we have had to take the acreage as given by the last census, and this may be entirely out of date. Now assessors are required to take a census of orchards every three years. This will give us a reliable basis for calculation.

VEGETABLE SECTION

Chairman, W. H. Weinschenk, New Castle

Secretary, W. B. Nissley, State College

The Vegetable Section had one of the best meetings in its history, both in attendance and interest. A large part of the program was round-table discussion, and it is unfortunate that a stenographer was not present to record these profitable experiences. The Secretary hopes to be able to arrange for a reporter to be present next year.

RESUME OF TALK ON ADVERTISING CAMPAIGN FOR GREATER VEGETABLE CONSUMPTION

BY H. F. TOMPSON

Massachusetts Agricultural College, Amherst, Mass.

Vegetable growers have every reason to be most optimistic about the future of their business. Scientists who have been studying human nutrition have made some discoveries which are of momentous importance to the vegetable growing industry. The discovery of the vitamins, the keener appreciation of the importance of the minerals placed by nature in the vegetable foods, and the greatly added value of vegetables as regulatory foods, have made it clear that our nation as a whole will greatly benefit through greater consumption of fresh vegetables. With such a foundation of fact, proven by scientists in the laboratory, advertised through national and state organizations working for the public welfare, heralded through the most prominent periodicals of the nation, we have a start for the most effective advertising campaign the world has ever seen, which will do good, not only to the producer of fresh vegetables, but to every person along the line who is affected.

Organization for the effective use of this material is a prime essential. It is to that, that the attention of vegetable growers needs to be directed, and some effective means must be found of taking advantage of this unusual opportunity.

A good advertising man makes a pretty careful study of his problem preceding any definite procedure. He needs to be thoroughly familiar with the project to be advertised to know whether it is an essential or a luxury. He needs to know to what class of people it appeals, its present market, its possible market, and the reason for its present use. It is important, also, to know what the present production is, and quality of that product; whether, if there is considerable advertising done, and a largely increased demand, there will be an in-

creased production to keep up with the demand, and whether the quality will be maintained. Another important question is whether the product has been advertised, and if so, what happened.

A study of all these questions will shed a good deal of light on any advertising problem, and vegetable growers need to give such study. A brief analysis may help in the present instance. Our vegetable crops come both within the class of luxuries and necessities. What we often considered a luxury ten years ago we now consider a necessity, and that is true of a good many of our vegetable crops which have been shown to be of exceeding value as health promoters. The breadth of the market for vegetable products is great. Cabbage and onions may appeal to certain types of folks, while our salad crops and fancy asparagus appeals to another class. With our new knowledge and better appreciation of the value of all these products there is little reason to believe but what most of the vegetable crops will be used by most of the people; that new ways will be found to make them attractive, and that better distribution will make a wonderfully increased market in every branch of the industry.

An illustration of the present market for our vegetables attained without advertising, and built up simply because of the acknowledged merit of our products, without even special effort on our part to see that they were particularly graded and marked, and most effectively handled, is well illustrated by a study of the receipts of the Boston market for 1922. The following indicates the size of this supply and the extent of the territory from which it is drawn. A carlot is normally represented by 500 bushels.

RECEIPTS IN THE BOSTON MARKET FOR 1922

Crop	Month Received	Total Amt. in Carlots	Home Grown Local	Outside States Supplying
Asparagus	5 mo. (3-7)	110	95	5
Beans	12 "	649	213	18
Beets	12 "	348	265	7
Beet Greens	5 " (3-7)	33½	33½	1
Cabbage	12 "	1,320	243	22
Cantaloupes	9 " (4-12)	1,726	None	19
Carrots	12 "	412	341	16
Cauliflower	10 " (9-4)	248	107	4
Celery	12 "	660	213	5
Corn, sweet	5 " (6-10)	287	280	3
Cucumbers	12 "	550	262	16
Dandelion	3 " (3-5)	122	122	0
Eggplant	12 "	61	13	6
Escarole	12 "	173	138	2
Kale	8 " (11-6)	135	29	3
Lettuce	12 "	1,833	1,411	14
Mushroom	12 "	50½	None	2
Okra	5 " (6-11)	12½	None	0
Onions	12 "	1,815	638	16
Parsley	12 "	53½	31½	3
Parsnips	10 " (9-6)	117½	111½	1
Peas	4 " (5-8)	62	11	12
Peppers	12 "	465	54	9
Potatoes	12 "	8,502	47	17
Radishes	12 "	107	102	1
Rhubarb	6 " (2-7)	105	95	2
Romaine	6 " (4-10)	103	97	1
Scallions	4 " (4-7)	48	48	0
Spinach	12 "	951	352	8
B. Sprouts	2 " (9-10)	5	0	5
Squash	12 "	306	183	22
Strawberries	7 " (1-7)	1,140	110	17
Tomatoes	12 "	1,509	304	16
Turnips	12 "	466	34	9
Mixed cars	12 "	172		15
TOTAL		23,530	7,160½	

On the basis of carlot receipts an analysis of these figures shows that the home grown product is a trifle less than one-third the total. This means that the demand is so strong for our type of products that they are received from nearly half the states of the Union. With such an unstimulated demand it surely seems that the opportunity is wonderfully great.

The Possible Market. This must surely be a matter of conjecture, but we have some basis for making estimates when we see what a wonderful increase in consumption the California Fruit Growers Exchange has brought about through its efficient advertising, where it has so multiplied the consumption of citrus fruits. If this can be done with such a limited field, what must the opportunity be with our broader field and greater variety of products?

Many folks are in the habit of eating certain vegetables, and their consumption comes quite largely because of habit. It may have been because they have become acquainted with them under very favorable circumstances, while with other vegetables they have not had such a favorable acquaintance. The cook has much to do with this, as does the quality of the crop itself, and the way in which it is handled from the producer to the consumer's table. It is clear that the vegetable grower must make it his business if he is out to increase consumption, to take care of the steps between the point of production and the consumer so that his product will create a favorable impression once it is sold, through efficient advertising. We have reason to believe that such will be taken care of.

The problems of production are many, but every vegetable grower realizes his own ability to increase production when there is an increased demand. It is fundamentally important to realize what are costs of production. It is equally important to be able to increase this production in proportion to the increased demand. The vegetable growing fraternity are able to handle this end of the problem with all success.

The quality question is an ever present one, and becomes more pressing the more we accept the responsibility brought about through an advertising campaign. Today we see the good, bad, and indifferent product on our market. We know the poor product curtails consumption more effectively than any other possible means. It works this way with you and with me, and so it works with every consumer. We assume an added responsibility, and we must provide an effective means of preventing the loss of our advertising efforts. This is a local problem which must come home to every grower. It needs continued emphasis. Advertising will increase the demand for better grades much more effectively than it will increase the demand for the lower grades, and this throws upon the producer a problem in production which he can meet

through adequate study, particularly through the service available from cooperative organizations.

Tom Jones advertised rhubarb and found that it worked well because he was able to sell more than he was ever able to sell previously. When his rhubarb crop was over, he stopped advertising. Jim Smith tried a similar stunt with his tomatoes, and he thought it worked well. He did it in his own crude sort of a way, and he found a ready response. His effort ended with his surplus in tomatoes. In such manner have sporadic attempts in advertising been made throughout the country, and most reports are favorable. Advertising experts say, however, that this is not the most effective kind of advertising, and will not bring the most returns per dollar spent. We have reason to believe that their claims are entirely correct. Today we seek a more efficient method of getting our story before the public at large.

Advertising has been and now is a major factor in maintaining successful business, and in building new lines of business. No business man of experience questions this fact. Nearly every progressive vegetable grower believes that the same principle will work for him. All agree that there is a wonderful future ahead of this industry, particularly through an effective advertising campaign.

The January number of the American Magazine, on page 112, contains an article by Dr. McCollum of John Hopkins University, which emphasizes the extreme value of fresh vegetables as a food for all people. It is worth while looking up this reference. Dr. Joel E. Goldthwaite of Boston, one of the outstanding authorities of this country, on health matters, makes these statements: "Everyone should eat every day, two salads of fresh, raw, uncooked fruit or vegetables. Everyone should have, every day, one liberal serving of some cooked leafy vegetable such as spinach, kale, cabbage, watercress, turnip or beet tops."

What is the best method of advertising for vegetable growers to adopt? Several plans have been carefully considered. Is it wise for us to adopt a national advertising campaign such as the Standard Oil Company constantly conducts? Should we tell the world about vegetables as Wrigley tells them about chewing gum? Have the California Walnut Growers adopted the right practice? We need to consider particularly our objectives and analyze the difficulties.

The Vegetable Growers' Association of America has been giving this problem a good deal of study and has concluded that the nature of the industry, the wide variety of products, the variation in methods of sale, the diversification of interests of individual growers, all increase the problem of accumulating a sufficient sum of money to carry on a great national advertising campaign, if such would be most effective. Further-

more, the illustrations above noted indicate problems of advertising quite different from those of the vegetable grower. In the case of the Standard Oil, there are a limited number of producers, and a well standardized and trade marked project. The same is true of Mr. Wrigley's products. The California Walnut Grower has almost a monopoly of his product in a favorable climate. On the other hand, the vegetable growers are scattered throughout the United States, most of them depending upon their local markets, or special markets developed through shipping associations. The problem becomes one of local advertising more than national, one of personal service or of organization service where the individuals or organizations may better realize that they are getting some definite reaction from the money that they have spent. An intensive study of this problem indicates the necessity of a different kind of contact than for the specialized industry with a limited number of products which are easily trade marked and handled through very definitely defined channels.

The Vegetable Growers' Association of America has concluded that it is best to work out a method whereby local advertising service can be rendered on a national scale, with a unified type of advertising material properly copyrighted and trade marked, prepared by an expert advertising man, published in large volume, so modeled as to be adapted to local users on occasion. Such a plan will provide for the preparation of effective posters to be placed in every grocery store and market, to be used by peddlers and other distributors of vegetable products. It also includes the preparation of attractive circulars indicating the time when vegetables will be on the market, how they can best be used, where they are coming from, and other data which may be helpful in increasing the sale. A large variety of cards, special letters, newspaper "copy" to be published in local newspapers, the preparation of cook books, and things of like nature can all be most effectively used. Each has its place and value.

In order to provide such service the Vegetable Growers' Association of America must obtain from the men who are to receive the benefit of the service, a working capital. This sum may not be large, but it should be contributed by men over a wide territory and so assessed that its contribution will not become a hardship, but a most valuable investment of money for better business.

The objects of the plan of the Vegetable Growers' Association of America are:

1. To provide comparatively low cost advertising material of the kind suggested above, and fitted for localities and individuals.
2. To copyright and furnish to members, slogans, designs, and a variety of material for good advertising purposes.

3. Accumulate orders for advertising material, finance the proposition from funds contributed, and supply this advertising material so that the service will be self-perpetuating.

We earnestly request the Pennsylvania vegetable growers to thoroughly discuss this problem and take some definite action which will indicate how Pennsylvania is willing to contribute to this proposed advertising campaign for the success of the vegetable growing industry.

RESUME OF TALK ON WASHINGTON ASPARAGUS

BY H. F. TOMPSON

Massachusetts Agricultural College, Amherst, Mass.

Asparagus is becoming one of the major vegetable crops in the United States. Its use is becoming quite general, where a few years ago it was considered a distinct luxury. Its health value as a vegetable food is extremely high, and without doubt it is going to become one of the most valuable of our vegetable crops.

The Washington asparagus today ranks as the best type known to asparagus growers. It has been developed as a result of a bad attack of a European disease, the asparagus rust, which nearly wiped out the asparagus growing industry in important sections back in the late 90's. Because of the great damage resulting from this asparagus rust some asparagus growers in Massachusetts formed an association and made an organized request for effective study of methods of control. As a result an experiment station for asparagus growers was established at Concord, Mass., as an adjunct of the Massachusetts Experiment Station. Cooperation was established with the United States Department of Agriculture, and Professor J. B. Norton was assigned to the task of solving the problem. He soon decided to attempt breeding as the most effective way to get out of the trouble. Fortunately he realized the importance of combining disease resistance and high market quality so that the product of his work, the Washington asparagus now on the market, not only ranks as highly resistant to asparagus rust, but of extremely high market quality. These two factors have given it such a reputation that almost every new asparagus plantation of this country includes Washington asparagus, and many of them are set to this one variety.

Bulletin No. 263 of the Bureau of Plant Industry, United States Department of Agriculture, entitled "Methods Used in Breeding Asparagus for Rust Resistance" is worthy of the study of every person who is interested in asparagus growing. It details the work of selection, tells the parentage of the various strains of Washington asparagus, and illustrates the methods adopted by an up to date plant breeder in carrying on his work. Through a study of this bulletin more can be

gained than can possibly be gained by any presentation that I can make of this story of asparagus improvement.

Asparagus being a dioecious plant, having the staminate and pistillate blossoms on different plants made it necessary to discover strong individuals of each sex which had the desirable characteristics. It was not only necessary to find plants which seemed to be right, but to learn that they had the ability of transferring their good qualities to their progeny. Professor Norton discovered one staminate plant which had this characteristic very strongly developed, and he named this plant "Washington". This was a product of a field of a variety known as "New American" grown on the farm of Anson Wheeler of Concord. The pistillate parents were carefully selected because of vigor and disease resistance, after several generations of test, and this strong Washington plant was crossed with these pistillate plants to obtain the first Washington asparagus. As the work developed a single individual was isolated from the group of female plants from Reading Giant stock and mated to the Washington. The strain resulting from the cross of these two individual plants was known as "Martha Washington."

The Mary Washington, which has received so much advertising, is the product of that same staminate plant with another pistillate known as Mary, which Professor Norton believes to be somewhat superior to those of the plant Martha. These characters are chiefly increased vigor, and size of stalk, which seems to be an inheritable character. Time will tell the comparative merit of the two. As yet, both are so young that their testing is still of too short duration to give very definite conclusion.

Asparagus rust is a disease which comes and goes according to climatic conditions and other influences beyond our knowledge. Some people claim that we have not as yet experienced an epidemic of rust as severe as that which occurred in the late 90's and about 1900. Never has asparagus been found which is completely immune to asparagus rust, but the strains about which we have been speaking are so resistant that the damage done by the disease is negligible. It came to our attention very recently that some plants of the variety known as Argenteuil, probably synonymous with Palmetto, — showed a good deal of damage from rust during the fall of 1922, while plants of the Washington showed practically no damage. The claim is made by some asparagus growers that strains of the Argenteuil or Palmetto or Reading Giant are equally good with the Washington. We are not disposed to dispute this statement. On the other hand, we believe that the careful breeding and the known pedigree of the Washington asparagus makes it the purest and best stock now known to horticulture.

OPPORTUNITIES IN VEGETABLE FORCING

C. R. MASON, State College

(Illustrated with lantern slides)

No other state offers better opportunities for the growing of vegetables under glass than Pennsylvania. There are definite reasons why some states will never become factors in the forcing industry; if I mention some of these, it may bring out certain facts favorable to Pennsylvania. Georgia will never force vegetables to any extent since the climate there permits the growing of crops in the open most of the year; at the same time Georgia crops may compete somewhat with Pennsylvania greenhouse crops. Nevada and other states in the Rocky mountain section are too close to the Sunshine state, California, to make forcing a profitable business, since in California, in one section or another, vegetables may be raised at all seasons of the year. North Dakota has too few markets of consequence as well as too severe a climate to promise development of the forcing industry.

Advantages of Pennsylvania. Pennsylvania has the favorable condition that these states lack, and more besides. Scattered over her surface are manufacturing and mining towns and cities almost without number, many of them greatly undersupplied with out-of-season vegetables. Ohio greenhouse firms find that Pennsylvania coal towns and the smaller industrial cities are some of their best markets. Why should not Pennsylvania growers have this trade? A retailer in Shenandoah tried this winter to place an order with a large Erie greenhouse establishment for 200 baskets of lettuce a week. The firm could not supply this demand even though they have six acres of glass devoted in winter to lettuce. Allentown and surrounding cities are so poorly supplied with green vegetables in winter that just a month ago two retailers there offered to supply the capital to start one of the vegetable gardening students at Penn State in the greenhouse business in Allentown, if he would agree to sell them the crops he would raise.

One of the largest items of expense in the greenhouse business is fuel. Pennsylvania is a great coal producing state, and since coal is cheaper near its source of supply, Pennsylvania growers thus have a decided advantage over growers in many other states, such as our great greenhouse state of Massachusetts.

The winter climate of Pennsylvania is not so severe that forced lettuce cannot be produced at a profit; but it is cold enough throughout the state and those states adjoining to make it impossible to hold over winter out of doors, the sorts of tender vegetables that we grow in our greenhouses. Many parts of the state have an abundance of winter sunshine, and

it is interesting to note that present forcing centers are not most favorably located in this respect. Favorable locations in Pennsylvania are not already occupied by greenhouses, by any means.

Not only does Pennsylvania have good markets, a good coal supply, and favorable climate, but also in many districts vegetable men find the types of soils most desirable for greenhouse vegetables, and abundance of water, available manure supply, and constantly improving transportation facilities.

Rank of Pennsylvania in Vegetable Forcing. At present, there are in Pennsylvania less than fifty acres of greenhouses devoted to the production of forced vegetables, while our neighboring state of Ohio has over three hundred acres. Pennsylvania has, also, about fifty acres in hot beds and cold frames, most of which are used for plant growing. Four million square feet of bed space are devoted to the growing of mushrooms; in this last crop, Pennsylvania ranks first, growing at least 75 per cent of the mushrooms produced commercially in the United States. In the receipts from the sale of vegetables and vegetable plants, Pennsylvania, according to the 1919 census, ranked third with a total of over \$1,700,000. Ohio was first in this respect and Massachusetts second.

The main forcing districts in Pennsylvania are at Erie, New Castle and Kennett Square with scattered ranges in about half the counties of the state. The mushrooms are shipped chiefly from southern Chester County, a few from Delaware and Montgomery, and a good many from Butler County. In Montgomery County is located the only commercial greenhouse of any size in the country that makes a specialty of greenhouse muskmelons; and in Bradford County are found some of the largest chicory producing firms in the United States. Philadelphia County is noted as a cold frame section.

In Pennsylvania are grown three main forcing crops, lettuce, tomatoes, and cucumbers. Many of our markets are not well supplied with these vegetables in winter, and for those that are, there are other crops that offer excellent opportunity, such as New Zealand spinach, Radishes, Witloof Chicory and Rhubarb.

As the value of fresh vegetables in the diet becomes better known, so will the demand for such products increase. Are we going to let growers in other states monopolize this profitable trade? Or will Pennsylvania growers take advantage of the excellent opportunities that are offered in many sections of the Keystone State for the production of vegetables under glass?

Slides

I thought the growers present might be interested in taking a brief trip through the forcing districts of Pennsylvania, by way of the lantern, to see something of the crops used in different sections and methods of growing them.

Philadelphia District. Through the Philadelphia district we have a few vegetable greenhouses, but large areas devoted to frame forcing, both in the Bustleton and the South Philadelphia Sections. Here market gardeners handle anywhere from a few hundred to several thousand sash. These frames are used not only for plant growing but also to force early spring crops to maturity, including Head Lettuce, Dandelion, Carrots, Parsley, Beets, Radishes, Cauliflower, Kohl Rabi, Green onions, and others. The frames are generally of the temporary type that may be removed in the summer to make way for later crops on the same ground.

Erie District. In Erie, we have the largest area of greenhouses of any section of the state, a total of over ten acres under glass. Zook and Sons lead with nearly six acres. Here the crops are lettuce and parsley through the fall and winter with tomatoes and cucumbers as spring crops. Winter tomatoes have not been profitable here due to lack of sunshine at that season. Much has been done in this district to cut down production expenses, especially by the Zooks. The latter firm plows the land under glass with a horse, ties the baskets with an automatic tyer, has a mechanical device by which the baskets of lettuce are dipped in a tank and then shoved onto a draining board, and other such labor and time savers. The overhead irrigation system is used extensively in this section as well as the New Castle district. Steam sterilization of the soil is also a general practice here. In Erie the type of greenhouse preferred is the large, even span, separate house ranging from 40 to 80 feet in width.

The New Castle section, with about half the acreage under glass that is found in Erie, is featured by the large side hill houses, such as the one here illustrated, 120 feet by 600 feet, owned by Mr. W. H. Weinschenk. Here some fall tomatoes are produced, but the main winter crops are lettuce and New Zealand spinach, with tomatoes and cucumbers in the spring, the former preferred. Mushrooms are also grown to a limited extent. New Zealand spinach is growing in popularity and will prove an excellent substitute for lettuce as a greenhouse crop, once the market becomes accustomed to it. Mr. W. H. Weinschenk and Mr. Isaac George, who are here, can tell you far better than I, how this crop is grown and what success they have had with it, if those of you from other sections are interested.

In Kennett Square, an entirely different rotation is followed. The only greenhouse vegetables grown are tomatoes and mushrooms. Tomatoes may be grown throughout the season with mushrooms under the benches, or tomatoes as a spring crop may follow early crop of flowers, as chrysanthemums or sweet peas. Benches are commonly used in the case of winter tomatoes, in order to provide bottom heat; or, if beds are used, the raised type is preferred for the sake of drainage. A peculiar system of training for winter tomatoes is used to some extent here. The vines are not topped as they reach the overhead wires but are allowed to continue growth. As the lower four or five clusters of tomatoes are harvested, the plants are bent down and the bare stems tied along wires running about a foot above the benches. The upper part of the plant now containing unripe fruit and blossoms is bent upward and supported on binder twine to the overhead wire some distance beyond the base of the plant. This system is usually practiced only with the outside rows, in order to extend the season of bearing, while the plants on the inner rows are removed after the lower fruit has borne and are replaced by new plants.

The Kennett Square section is also the largest mushroom producing district in the United States. Here we find all types of special mushroom houses, from the old wooden sorts to the more modern and durable hollow tile houses with asbestos shingle roofs. Mushrooms are also raised under greenhouse benches as well as in warehouses and old barns that have been converted to the purpose. In Butler County a large cave, containing a million square feet of beds, is devoted to mushroom production, and this crop is also raised to a more limited extent in Montgomery, Delaware, Lancaster, and Lawrence Counties.

Other Forcing Points. At Wales Junction, Montgomery County, the Lansdale Mushroom Company devotes its greenhouses to the raising of fall tomatoes followed by spring muskmelons. This is the only commercial melon range of any size in the United States.

Bradford County boasts of two firms that specialize in growing Witloof Chicory. From this county is shipped to all the larger cities east of Cincinnati over 50,000 pounds of Witloof annually. Competition on these markets comes chiefly from the same product imported from Belgium and France.

Rhubarb is little forced in Pennsylvania and yet should offer good returns because of its general popularity in all markets. Radishes and other crops might also be grown by those who feel the production of leaf lettuce is unsafe, due to competition from western and southern head lettuce. The latter is now one of the main problems of the eastern greenhouse man. But I believe that by judicious advertising the consump-

tion of lettuce may be so increased that the greenhouse leaf lettuce industry will not only hold its own but may even expand.

Considering the small number of greenhouses now located in Pennsylvania and the advantages we have in markets, coal supply, and other things so essential to the man who raises crops under glass, there seems to be no lack of opportunity in this state in the business of vegetable forcing.

SPRAYING AND DUSTING VEGETABLES IN NEW JERSEY

C. H. NISSLEY, New Brunswick, N. J.

I have been traveling up and down the state of New Jersey for the last six years in the interest of the vegetable growers. In the majority of cases their troubles sifted down to insects and diseases affecting their crops. Pennsylvania growers have, I should imagine, the same troubles.

Dusts Used. Dusting and spray work for the control of insects and diseases was started in 1922. This work was conducted in cooperation with the Departments of Plant Pathology and Entomology. One dust used for aphid control is manufactured by the Niagara Sprayer Company, known as D 11; it contains $2\frac{1}{4}$ per cent nicotine. The other was made by our State Entomologist, Dr. T. J. Headlee, using as a base or carrier a dolomite dust. Experiments by Dr. T. J. Headlee showed that the nicotine given off by the Niagara Dust was about 12 per cent for the first twenty-four hours, while that of Dr. Headlee's dust was as high as 24 per cent of its nicotine in the same time, thus liberating double the amount of gas.

Now let us consider the killing power of this dust. It is not a contact insecticide. It kills by means of gas which evolves from the carrier. The direct hit is much better and will give greater control than where the insect does not come in contact with the dust. The character of the plant dusted, and possibly the position of the aphid on the plant will greatly affect the percentage of kill. With such plants as the potato, tomato, muskmelon, watermelon, and cucumber, whose leaves cover the ground and form a more or less dead air space between the ground and the leaves, when the dust is placed under the leaves the gas liberated will be very effective. In the case of onion thrip and pea aphid, where the aphid is exposed, the direct hit is necessary.

The crops dusted for aphid in 1922 began with peas, in the latter part of May, followed by potatoes, peppers, early onions for thrip control, then later the aphid of turnips, cucumbers, muskmelons and eggplants. In brief, the following

recommendations for dusting have been made by Dr. Headlee, our Entomologist. In these experiments we find that the best time to apply the nicotine dust is in the heat of the day when there is no wind. It is the common opinion that all dust should be applied while there is dew on the plant, but not so with nicotine dust. We have proven that moisture or water will render the dust ineffective. This is not true when the dust contains arsenate of lead; then it is advisable to dust when the dew is on the plant so that the dust will stick better. Arsenate of lead is a stomach poison for chewing insects.

Control of Striped Cucumber Beetle. Nicotine dust was used on the striped cucumber beetle and was found very effective. Heretofore we used Bordeaux and arsenate of lead to repel these insects but nicotine dust will kill them. We used a puffer as the Vermorel duster, with a four or five foot nozzle so that we did not necessarily have to get on top of the hill before applying the dust. This beetle is rather shy and will fly as soon as it is disturbed. They will fly a foot or so after they are dusted. They will fly six to eight inches the second time and it will not be long until they kick over on their backs. In many instances on cucumbers, cantaloupes, and squash where the dust has been applied we have practically a 100 per cent kill.

We know that if we control the striped cucumber beetle we will also control the bacterial wilt of these crops. Potato slugs and other soft bodied insects can be effectively controlled with nicotine dust. It was also used by the largest greenhouse man in the state for aphids, squash bug, and cucumber beetle. This man has an orchard duster and towards evening he closes his ventilators and dusts the house, applying the dust through each side ventilator. He has gotten practically 100 per cent control of these insects by this method. Heretofore it has been his practice to fumigate with cyanide. This method of insect control under glass must be done with care to avoid burning. I have never seen any burning from the nicotine dust, with one exception. That was in the control of the aphids on cucumbers, with a dust which had lime as a carrier. It was very dry at the time of applying this dust and we put it on rather heavily around the hill and on the leaves. The weather continued dry and we had burning of the leaves. This burning, we thought, was due to the fact that the lime drew the water out of the leaves, causing burning. Under normal conditions this would never happen.

The work of the Department of Entomology, New Jersey Agricultural Experiment Station, on nicotine dust, seems to justify the following conclusions:

(1) The value of a nicotine dust in the instances where it has been tried depends not primarily upon the charge of

nicotine with which it is impregnated but upon the amount of nicotine gas which it will evolve within the first 48 hours after its application:

(2) In dealing with the pea aphid (*Macrosiphum pisi*) the percentage of kill varies more or less directly as the amount of nicotine gas delivered per acre from the dust:

(3) High evolving nicotine dusts give better results in aphid kill when applied after the dew has dried off than when applied while the dew is still on:

(4) Rainfall of any considerable amount puts an end to the activity of nicotine dust:

(5) When dealing with a dust impregnated with nicotine from free nicotine sources the drier and hotter the time when it is applied the more effective is the treatment likely to be:

(6) When dealing with a nicotine dust impregnated with nicotine from a sulphate source the higher the temperature the better, but the best results are secured from an atmospheric moisture somewhere in the neighborhood of 73 per cent:

(7) Dosage studies indicate that the minimum practical charge of a 1½ per cent free nicotine dolomite which evolves 24.78 per cent of its nicotine in a 48 hour period under a temperature of 80 degrees F and an atmospheric moisture of 73 per cent, is 50 pounds per acre where peas are planted in rows in the neighborhood of 40 inches apart and that from 1 to 3 treatments of this material are necessary to protect the peas from injury:

(8) Dosage studies indicate that the minimum acre charge of the above mentioned dust on potatoes infested with the pink and green aphid (*Macrosiphum solanifolii*) is 30 pounds and that from 1 to 3 treatments of this dust is necessary to protect the potatoes from noticeable plant louse injury:

(9) Evolution of nicotine gas was determined by drawing air, which was conditioned to 80 degrees F. and 73.4 per cent atmospheric moisture at the rate of 1 liter in 10 minutes, through 10 grams of nicotine dust, which rested in a glass tube 1 inch in diameter on a layer of ordinary absorbent cotton ¾ of an inch deep, for a period of 48 hours. The height of the dust layer was about 1 inch. While this method gives satisfactory results for the comparing of the evolution of nicotine gas from different kinds of nicotine dusts when all are tested under exactly the conditions specified above, it is not thought that the amount of gas evolved in this way is anything like as large as that which escapes under field application conditions. Under field conditions the percentage of the surface of each particle exposed to the air and the probable consequent volatilization of the nicotine film would be very greatly increased.

Nicotine Sprays. We have secured very good results by the use of nicotine spray. In the case of the pea aphid each spray block showed a greater per cent of kill than on the dusted block, giving as high as 89 per cent kill. In spraying for the aphid we have recommended not less than 200 pounds pressure with three nozzles to the row, two nozzles riding as near the soil as possible and close to the plant, with an upward spray. In spraying with 200 pounds pressure the leaves are blown up and the under side of the leaves, which are generally infested by the aphid, are covered. We have devised a new boom, the principle of which is not new, in which the drop nozzles trail on the ground by means of a shoe hung on the cross member. This nozzle can be regulated from one-half inch to eight inches from the soil.

Great care must be taken in spraying vegetable plants for aphid control, because good spraying is hard to do unless the grower has had the spray program in mind at the time of planting. The rows must be very straight and of equal distance from each other.

In the control of the onion aphid, our results have been very good. We sprayed with 225 pounds pressure and used an orchard rod or spray gun. We used nicotine in the ratio of 1 - 500, 1 - 1,000 and 1 - 1,500 parts of water, plus eight pounds of soap to the 100 gallons of water. We secured just as good results with the 1 - 1,500 as we did with the 1 - 500. The results were about 97.6 per cent control, using approximately 600 gallons of spray to the acre. It must be understood however, that these onions were planted in 12 inch rows.

Dusting for Diseases. We have excellent results from spraying for disease, but poor results from dusting. We have dusted for the control of celery blight, tomato blight, and potato blight. In some other states they have gotten very good results, but not in New Jersey. For the last two years the Alphano Humus Company, in northern New Jersey, has grown 125 acres of celery which was dusted. The blight came on and you could not tell which plants had been dusted and which had not. Mr. Meisch, one of our best celery growers in northern Jersey, bought a duster in the spring. He dusted a few times, but when the celery blight came he got out his sprayer. The duster is now for sale. I do not mean to infer that vegetable diseases cannot be controlled by the use of the anhydrous copper dust. I am simply stating that we in New Jersey have not so far, found it successful.

Spraying for Diseases. In the last two years our work with the melon and cucumber blight has been very successful. We have saved the crop through spraying, while unsprayed blocks went down with the disease. The sprayed blocks ripened until late in September when the cool nights came on.

The mixture used was the 2-3-50 Bordeaux; that is, two pounds copper sulphate, three pounds good stone lime to 50 gallons of water.

We do not recommend the spraying of tomato for blight control, especially the late crop. It may be possible that spraying second early tomatoes would be a paying proposition. In our demonstration work on tomato blight for the past three years we have received just as good results from the plants receiving supplementary applications of nitrate of soda or sulphate of ammonia, at the rate of 200 or 160 pounds respectively. The added vigor which the fertilizer gave the plants apparently warded off the disease.

We have had some very interesting work on celery spraying for blight control. Our recommendations are two applications of the 3-4-50 Bordeaux while the plants are still in the seed or plant bed and the 5-6-50 Bordeaux after the plants are set into the fields.

We have had some very interesting times in this work. With one man in Passaic county the first two sprayings were applied very much against his will. The third time we sprayed he was more willing to have the spraying done, having noticed the better condition in the sprayed field. At the fourth and fifth sprayings we had a hard time to keep him from spraying the check plants. The intake of the sprayed over the unsprayed celery averaged from \$400 to \$500 per acre net. We used three nozzles to the rod, with the flexible boom. This is where the flexible boom showed very good results. The position of the top nozzle is about 12 or 15 inches ahead of the drop nozzle. In spraying with 200 to 300 pounds pressure the liquid from the top nozzle seems to open up the heart of the celery, allowing the spray to get there, while the two side sprays have the opposite effect, closing up the leaves again. The rigid spray booms were of three nozzles, the two side nozzles working against the action of the top nozzle in the ratio of two to one, which has the effect of closing the heart of the celery and rendering the spray less effective. On maturing celery, 175 - 200 gallons of material per acre, applied with care is not excessive.

Where vegetable industries are localized it is much easier to put on this work and get results. In Cape May County many are growing canteloupes for the summer trade of the shore. These men have not been able to grow profitable water-melons and canteloupes due to the blight. As a result of our demonstration work and the cooperation of the hotel men along the shore, a meeting was held in the county court house, at which time the standard variety to be used in the county was selected and plans were made to form a spray ring.

Many of our men grow products which their markets do not demand. We are trying in New Jersey to produce what our markets demand; to produce quality, size, shape, and pack uniformly and honestly. Standardization is coming in New Jersey as it is in Pennsylvania. It will take time, but this is our ultimate goal.

PORTABLE IRRIGATION

R. J. WALTON, Hummelstown

As this subject was handled very largely as a round-table discussion, not a paper, and since no stenographer was present to take the discussion the Secretary will report the following summary:

Mr. R. J. Walton has six acres of permanent irrigation which he uses on his most important crops, especially celery. He had fifteen acres planted in 1922 on which he used portable irrigation. He uses a two-inch main along the side of the field on the top of the ground. This is 1,200 feet long. The lateral portable lines are 400 feet long, in 100 foot lengths and connected with ground joint-couplings. The pipes are laid on blocks distributed at intervals. The size of the pipe in the 400 foot lengths varies from one and one-half inch to the two-inch main to three-quarter inch at the other end. It requires six men to change a 400 foot lateral line.

The pressure is sufficient to supply two 400 foot lateral lines at one time. The nozzles are three feet apart. It requires about one and one-half hours to shift four lines. Mr. Walton considers that this portable irrigation has been very beneficial. It was a dry summer and fall and the success of his celery crop actually depended upon the artificial watering which it received. The consensus of opinion seemed to be that where there is not sufficient capital available to establish permanent irrigation that a temporary system should be available for use.

MY FIRST YEAR'S EXPERIENCE IN COMMERCIAL VEGETABLE GROWING

GILBERT S. WATTS, Bellwood

As I was coming in on the train this morning I began to wonder what turn of events it could be that had led up to a situation where I, a young upstart, should soon be taking up the time of an assembly of experienced vegetable gardeners. It all led back, it seemed, to a big wheelbarrow load of well rotted manure.

How could a wheel barrow of rotten manure be responsible for this? Very easily, for back in Cambria County not so many years ago a kid got a kid's idea in his head. He dug a hole about two feet square and at least that deep. Then he hunted up his father and aired his idea. It seemed that hole was destined to be filled with rotten manure, topped with the best plant growing soil and in that soil were to be planted twelve pumpkin seeds. There the story begins. That kid's Dad, who happens to be my Dad, not only supplied the requisite but threw in some bone meal for good measure. When the plants were to be thinned Dad suggested and supervised. There were never such pumpkins before or since and the kid just naturally fell so in love with making plants grow that he has never recovered.

On June 30 I loaded a big load of early cabbage, my first, and it was the earliest considerable quantity of home grown cabbage to reach my chief market. Yet that was the hardest load to sell of the whole summer! Why? Simply because no one knew I was to have a big lot of cabbage to sell about a certain date. I had not prepared the way for myself. Certainly it pays when one has a large quantity of any product nearing maturity to do a little advance advertising if it is only to phone your best dealers several days ahead.

I grew some celery and forced it so hard with nitrate at the last to get size into it that it was about the brittlest, tenderest stuff you ever saw. When getting the first lot ready for market I decided the quality was about right. The storekeepers bought it like hot cakes—the first time around. What was wrong? The celery was so tender and succulent that it would not hold up. In a few hours it was all but unsalable. I knew the quality was there and the thing was to get that quality to the consumer. The solution was to pack tightly in chip baskets lined with butcher's paper folded over from each side. If plunged in cold water, removed and placed in a cool place celery so packed remained in first class condition for several days.

As manure is almost a thing of the past in my section I have worked in green manure at every possible opportunity. I used buckwheat, rye alone, rye and vetch, and they all have their place but for a crop to follow early potatoes or early cabbage I have seen nothing to beat oats sown at the rate of four bushels per acre about the middle of August. On my rather poor soils it ran clear away from anything else suitable for seeding at the season mentioned. In late October it was about 30 inches high. The root growth when the crop was turned under reminded one of a timothy sod. Doubtless sweet clover and other legumes will be more satisfactory as soil conditions improve.

Having had comparatively little experience with celery storage I divided my crop between three methods. All was lifted rather green, roots and all. Part was stood upright in the deepest cold frames and protected from the weather with sash, mats on at all times. Part was similarly handled but went into thoroughly moistened soil in the dirt ground floor of an old time "bank barn". The rest was stored in outdoor trenches a foot wide and not quite as deep as the celery was tall. "Saddles" of 12" boards nailed in "A" shape were placed over the trenches and horse manure was placed over the saddles when severe weather came on. The celery in the cold frames rooted just fairly well but there was some loss from heating. That in the barn lost weight from low humidity. That in the trenches rooted well, blanched well and came out at Christmas in perfect condition except in one short trench where we had been too good to it and caused heating.

As to fertilization, I sought the advice of college experts and practical growers. Uniformly I was advised to be liberal. I screwed up my courage when I figured the bill it would mean but went the limit of the advice. Everything in the vegetable line received 1,000 pounds per acre of high grade home mixed goods and a lot of stuff had twice this dose. The early cabbage received 1,500 pounds 3-8-5 broadcasted and harrowed in and 500 pounds of bone when the plants were set. When two-thirds grown 200 pounds per acre of nitrate of soda was used as a top dressing. One row was given a double dose and although no records were made I know that row was 50% more profitable. It was earlier, heavier, and cut about 90% the first go. In the late cabbage a small section was given just twice what the rest of the field received and between the combined ravages of dry weather and Black Leg most of the late crop did not bring enough to pay the labor of growing it but this section actually made a fair crop.

Now I wonder, "What is the limit of profitable fertilization?" Certainly it varies between your soils and mine, but in general terms what is the limit? In most of the data on vegetable crop fertilization the highest rate has given the greatest profit. In the experience of many growers the same observation has been made. Several experiment stations are studying the problem of maintaining fertility in the market garden or truck farm with reduced supplies of manure but is there not a need for special research to study the limits of profitable fertilization in vegetable production?

IMPROVEMENT OF VEGETABLES THROUGH SEED

SELECTION

C. E. MYERS, State College

Before undertaking definite work in crop improvement, it is well that we have in mind a few matters of fundamental importance if we are to pursue our work with a reasonable degree of success. While it is true that considerable improvement has been made along some lines, by persons who have had an ideal in mind and constantly worked toward that ideal, yet much time and effort might have been saved, had the worker thoroughly understood the underlying principles which governed the work he was attempting to do.

Within recent years our knowledge of the laws of breeding has been greatly increased and unusual results in breeding, which were primarily unaccounted for are now readily explained by the application of well established laws of heredity.

Perhaps the most important contribution to the present knowledge of breeding is the fact that an organism is made up of a very large number of heritable factors which are carried in the germ cells and which determine the physical characteristics of the individual. These characters are expressed as *dominant* when the effect is present in the first generation of a cross, or *recessive* when it is masked by the dominant character. Thus in the case of tomatoes: if we cross a variety having yellow fruit by one having red, the fruit which sets from this crossing will be yellow. When seed is sown of it, the resulting plants will all give red fruit, since red is dominant to yellow and if seed is saved from these red fruits and planted, three-fourths of the resulting plants will produce red fruit and one-fourth will produce yellow fruit. Of the yellow fruited plants, all will continue to produce yellow fruit, while of the red fruited ones, some will produce red and some yellow. This being the case, it would be futile to attempt to develop a red variety from the yellow by selection, although it is entirely possible to select a yellow from the red, as well as to develop a red variety which will be pure. In either case, we need only to keep the seed of each plant separate, grow it and test its purity. If we do this for a score or more of plants, we shall find some which are pure; and unless accidental crossing takes place, which is quite rare in the case of tomatoes, they will continue to breed pure.

In the case of self-pollinated plants, like tomatoes, wheat, etc., it has been proved repeatedly that there is nothing to be gained by continuous selection. The first selection is the important one. In our work with tomatoes, we made quite a number of selections several years ago, of individual plants which seemed to be superior. The selection was made in a

field of commercial strains of a number of varieties. The seed of each plant was kept separate and the following year the various selections were tested under uniform conditions. These tests showed that in most cases the supposed superiority of the plants was due to environment and not to heredity, and hence was not transmitted. One lot, however, was superior and was continued in the test for eight years. Each year a selection was made of seed from what appeared to be the most superior plant of the generation. This was continued year after year, and each time the selection was compared with its ancestors. In the eighth season, when all of the different selections were compared, it was found that no important improvement had been made on that of the original selection, although it was of itself much superior to the average variety and strain from which it had been selected.

In the case of cabbage, which is a cross-fertilized crop, our work has shown that careful attention to the selection of the plant stocks is of fundamental importance and we believe it to be a more potent factor in the development of good seed than is that of climatic influence, to which attention has mainly been directed in the past. By the use of special care in the selection of plants to be used for seed, we have succeeded in developing a superior strain, and know of others who have done likewise. Selection will not put into a plant that which is not there, but if properly conducted will permit the expression of factors which may appear dormant and which are awaiting the opportunity for expression when favorable conditions are present.

AFFILIATED COUNTY HORTICULTURAL SOCIETIES

The following County Horticultural Societies are affiliated with the State Horticultural Association, under Article II of the Constitution.

ADAMS COUNTY FRUIT GROWERS' ASSOCIATION

Reorganized March 10, 1922

OFFICERS

<i>President</i> , C. A. GRIEST	Guernsey
<i>Vice Presidents</i> , W. E. GROVE	York Springs
FREDERICK E. GREIST	Flora Dale
C. A. WOLFE	Gardners
<i>Secretary</i> , EDWIN C. TYSON	Flora Dale
<i>Treasurer</i> , WM. S. ADAMS	Gardners

MEMBERS

*Adams, Wm. S.	Gardners
Asper, D. C.	Aspers
Bream, Samuel	Biglerville
Boyer, W. W.	Arendtsville
*Baughner, H. G.	Aspers
Baughner, Ira	Aspers
Bittinger, C. H.	R. D. 6, Hanover
Benner, B. E.	Virginia Mills
Boyer, George E.	Arendtsville
Bushman, S. F.	Gettysburg
Bream, H. J.	Aspers
Blessing, David H.	Harrisburg
Bream, W. A.	Gettysburg
Brinton, H. C.	Hanover
Baltzley, C. S.	Orrtanna
Baltzley, S. Luther	Orrtanna
Butt, J. L.	Gettysburg
Carey, J. Calvin	Gettysburg
*Crouse, E. A.	Gettysburg
*Cation, W. R.	Orrtanna
Cole, James C.	Biglerville
Deardorf, Anthony	Gettysburg
Dock, Miss Margaret	Fayetteville
Dock, Miss Mira L.	Fayetteville
Davis, Wm.	York Springs
Dougherty, Dorsey	Gettysburg
Deatrick, H. G.	Hunterstown
Diller, O.	York Springs
Dill, Dr. M. T.	Biglerville
Deardorff, Charles	Orrtanna
Dull, Thomas D.	Aspers
*Eldon, Robert M.	Aspers
Eiholtz, S. Mc.	Biglerville
Enck, W. K.	Biglerville
Eppelman, H. C.	Aspers
Eshelman, S. C.	Gettysburg—5
Fraim, Merritt L.	Aspers
Fohl, George G.	Biglerville
Fiddler, W. B.	Aspers
*Griest, C. Arthur	Guernsey

Griest, A. W.....Flora Dale
 *Griest, Frederick E.....Flora Dale
 Griest, Maurice.....105 W. 163d St., New York City
 Garretson, Frank.....Aspers
 *Garretson, Eli P.....Biglerville
 Garretson, Robert.....Flora Dale
 Garretson, Eli.....R. D. 5, Gettysburg
 Garretson, John.....Aspers
 Gardner, L. M., Jr.....York Springs
 *Grove, W. E.....York Springs
 Groupe, Foster C.....Gardners
 Howard, Jno. M.....Aspers
 Hoffman, James O.....Arendtsville
 Hoffman, Robert.....Arendtsville
 Hoffman, E. N.....Biglerville
 Hoffman, D. M.....Biglerville
 Hoffman, George.....Arendtsville
 Huber, Charles H.....Gettysburg
 *Hartman, George R.....Biglerville
 Hummel, P. T.....Harrisburg
 Hershey, C. A.....McKnightstown
 Hartzel, B. L.....Flora Dale
 Jacobs, Daniel C.....Gettysburg, No. 5
 Keller, H. M.....Gettysburg No. 5
 Klinefelter, U. S.....Biglerville
 Kane, J. A.....Biglerville
 Kane, J. Lewis.....Gettysburg, No. 5
 Knouse, J. A.....Arendtsville
 Kunkle, Jno. R.....Gettysburg
 Koser, Rev. D. T.....Arendtsville
 Koser, G. W.....Biglerville
 *Keller, S. C.....Gettysburg, No. 5
 *Keller, Paul.....Gettysburg, No. 5
 Knab, Mrs. George N.....New Oxford
 Longsdorf, C. L.....Biglerville
 Lawver, Rufus W.....Biglerville
 Lupp, Reuben.....Biglerville
 *Large, Katherine S.....Orrtanna
 Large, Mrs. E. S.....Orrtanna
 Lippy, J. D.....Gettysburg
 Lewis, Harvey D.....Orrtanna
 Lucabaugh, J. W.....Hanover, 6
 Myers, George P.....Biglerville
 Minter, Thomas L.....Biglerville
 Musselman, C. H.....Biglerville
 Miller, E. M.....Hanover
 Moyer, Dr. H. B.....Gettysburg
 Myers, R. E.....York Springs
 Marsh, G. T.....Walbrook Apartments, Baltimore, Md.
 Minick, W. L.....Waynesboro
 *Musselman, Jno.....Orrtanna
 Oakwood Corporation.....York Springs
 Oyler, George.....Gettysburg
 Oyler, George C.....Gettysburg
 Orner, P. S.....Arendtsville
 Orrtanna Canning Co.....Orrtanna
 Orner, Harry.....Aspers
 Orner, I. S.....Arendtsville
 Prickett, Josiah W.....Biglerville
 Peters, W. V.....Guernsey
 Peters, Curtis W.....Biglerville
 Pitzer, Harry C.....Aspers

Peters, George M.....Aspers
 Pitzer, Willis.....Arendtsville
 Peters, Jno. B.....York Springs
 Peters, Mrs. J. H.....Bendersville
 Pepple, Samantha.....Orrtanna
 Raffensperger, Charles E.....Arendtsville
 Raffensperger, Roy.....Arendtsville
 Raffensperger, Harvey E.....Arendtsville
 Rice, E. E.....Aspers
 Rice, O. C.....Biglerville
 Rice, C. S.....Arendtsville
 Rice, A. E.....Biglerville
 Rhodes, T. F.....Aspers
 Roberts, Arthur.....Gettysburg
 Riddlemoser, H. E.....McKnightstown
 Rex, Raymond.....Gardners
 Shorb, Albert.....Hanover
 Stover, Dr. J. G.....Bendersville
 Strong, George C.....Orrtanna
 Slaybaugh, Elmer.....Aspers
 Smith, G. Frank.....Aspers
 Shull, Robert H.....McKnightstown
 Spangler, George E.....Gettysburg
 Snyder, E. Bane.....Jack's Mountain
 Starner, A. E.....Aspers
 Sachs, Edw. S.....Biglerville
 Stock, E. C.....3610 Clifton Ave., Baltimore, Md.
 *Strasbaugh, E. F.....Orrtanna
 Sheely, A. D.....Arendtsville
 Stahle, C. E.....Gettysburg
 Starry, W. D.....York Springs
 *Tyson, Edwin C.....Flora Dale
 *Tyson, Chester J.....Flora Dale
 *Tyson, Wm. C.....Guernsey
 Taylor, Jacob F.....Arendtsville
 Taylor, Daniel R.....Biglerville
 Taylor, Henry.....Biglerville
 Trostle, Francis.....R. F. D., York Springs
 Thomas, Mrs. Annie M.....Gettysburg
 Topper, Z. F.....Emmitsburg, Md.
 Thompson, G. R.....Gettysburg
 Taylor, A. M.....Biglerville
 Vance, Charles T.....Orrtanna
 Weidner, A. I.....Arendtsville
 Wolfe, C. A.....Aspers
 Wolfe, Harry E.....Aspers
 Wolff, Dr. W. E.....Arendtsville
 *Wolf, Charles M.....York Springs
 Wilson, B. F.....Biglerville
 Weaner, Charles C.....Bendersville
 Weaner, W. C.....Aspers
 Wible, R. E.....Gettysburg
 Wright, Ryland.....Aspers
 Weaver, D. I.....Gettysburg
 Williams, J. L.....Gettysburg
 Williams, M. I.....Gettysburg
 Walter, Martin T.....Biglerville
 Walter, J. C.....Biglerville

THE BERKS COUNTY FRUIT GROWERS ASSOCIATION

Organized 1922

OFFICERS

President, SHELDON FUNK Boyertown
Secretary, W. W. LIVINGOOD Leesport

MEMBERS

Balthaser, James Wernersville
Bridenbaugh, John H. Reading, Liberty Bank Bldg.
Deiner, W. S. Boyertown, R. D. 2
DeLong, Cletus Y. Mertztown, R. D. 2
Doty, H. M. Stony Creek Mills
Doty, Richard Stony Creek Mills
Eagleman, J. G. Geigers Mills
Eisenbrown, Robert W. Gouglersville
Funk, Sheldon Boyertown
Haring, S. A. Reading, 901 N. 11th St.
*Hershey, H. F. Hamburg, R. D. 3
Hinkle, Jacob E. Oley, R. 1
Kruppenbach, Harry H. Robesonia
Lenhart, Richard L. Reading, Kline, Eppihimer Co.
Livingood, W. W. Robesonia
Markely, N. S. Shanesville
Mayer, L. E. Boyertown
Melcher, Bennett A. Bally
Melcher, George W. Bally
*Rick, John Reading, 434 Oley St.
Rittenhouse, J. H. Lorane
Rittenhouse, Samuel Lorane
Rohrer, G. H. Mertztown
Shearer, Walter J. Vinemont
Sheble, Earl Hamburg
Schmick, Wilson E. Hamburg
Wertz, Samuel H. Leesport

CHESTER-DELAWARE FRUIT GROWERS ASSOCIATION

OFFICERS

President, GUY L. HAYMAN Northbrook
Vice-President, ARTHUR LINVILL Media
Secretary, HERBERT C. BARKER West Chester
Treasurer, RUSSELL WORTHINGTON West Chester
Purchasing Agent, M. BARTRAM West Chester

MEMBERS

Barker, Herbert C. West Chester
Barnard, C. P. Northbrook
*Bartram, George & Son West Chester
Bird, Anna W. Brandywine Summit
Crowell, A. & T. Avondale
Darlington, Hibbert West Chester
Dickey, Samuel Oxford
Dodge, Geo. P. East Downingtown
Dunlap, George P., Hillwood Fruit Farm Glen Riddle
Hayman, Guy L. Northbrook
Hayward, Charles E. Westtown
Ivins, William A. Media
Kelly, Margaret West Chester
Keech, M. H. West Chester
Linvill, Arthur Media
Nolan, John V. Malvern
Parker, Caroline R. West Chester
Passmore, N. S. Chester Heights
Perrigo, A. H. West Chester
Phillips, Charles S. Ocopson
Ray, J. E. S. West Chester
Romig Brothers Downingtown
Sargent, George Glen Mills
Scott, A. H. Wallingford
*Smedley, S. L. Newtown Square
Smedley, S. L., Jr. Newtown Square
Smedley, Walter Media
Thomas, Carl West Chester
Vandergrift, William West Chester
Walker, James Westtown
Welsh, George A. Moylan
Wolff, F. E. Lima
Worthington, Russell West Chester

Report of the President

This association has four meetings a year, in March, June, September and January.

The feature of the March meeting was the discussion of the marketing of apples and cold storage plants. The direct outcome of these discussions was the organization of the "Fruit Growers Cooperative Association of West Chester", which is a business association entirely independent of, though developed through, the "Fruit Growers Association of Chester and Delaware Counties".

The June meeting was a field trip covering five orchards from Birmingham to Oxford. Dr. E. L. Nixon was the speaker

and the trip was in charge of William Vandegrift, Farm Bureau Agent. The principal subjects of study were apple scab and collar rot.

In September a field meeting was held in Delaware County under the care of Farm Bureau Agent Atkinson. At Mr. Wolf's place a new and modern common storage was seen and at Mr. Ford's a \$30,000 private cold storage plant, both of which are giving satisfactory service.

The January meeting was held in conjunction with the "Farm Products Show of West Chester". Mr. Paul Thayer answered questions of current interest. The apple department of the Farm Products Show was very successful. It consisted of 151 plates, 31 half bushel baskets, 6 bushel baskets. An interesting feature was a class for packages direct from storage to be opened by judges and judged from buyer's standpoint.

GUY L. HAYMAN, *President*.

CUMBERLAND COUNTY FRUIT GROWERS ASSOCIATION

Organized 1922

OFFICERS

<i>President</i> , H. W. ALLISON	Shippensburg, R. D.
<i>Vice-President</i> , DR. C. S. BASEHOAR	Carlisle
<i>Secretary</i> , GALEN H. GATES	Shippensburg
<i>Treasurer</i> , JAMES DUNLAP	Shippensburg, R. D.

MEMBERS

Allison, Herbert	Shippensburg, R. D.
Barbour, Baettie	Shippensburg
Basehoar, Dr. C. S.	Carlisle
Berry, Dr. E. S.	Shippensburg
Bushman, H. M.	Carlisle
Cameron, John	Carlisle, R. D. 1
Dennis, R. M.	Carlisle
Duncan, D. G.	Shippensburg
*Dunlap, James M.	Shippensburg, R. D.
Gates, G. H.	Shippensburg
Heberlig, Herbert	Newburg
Henry, Harold	Shippensburg
*Leonard, Frank	Carlisle, R. D.
Mowery, N. E.	Shippensburg
Stough, Mulford	Shippensburg
Worst, D. C.	Carlisle, R. D.

FRANKLIN COUNTY HORTICULTURAL SOCIETY

Organized January 21, 1922

OFFICERS

<i>President</i> , W. O. BINGHAM	St. Thomas
<i>Vice-President</i> , CHARLES W. REICHARD	Waynesboro
<i>Treasurer</i> , D. EDWARD LONG	Chambersburg
<i>Secretary</i> , WILLIS A. HESS	Mont Alto, R. 1
<i>Assistant Secretary</i> , R. J. GILLAN	St. Thomas

MEMBERS

Alexander, W. M. & Son	Dry Run
Amberson, P. N.	Waynesboro
Barkdoll, A. E.	Smithsburg, R. 3, Md.
Barr, I. C.	Greencastle, R. 2
Benedict, F. W.	Waynesboro
Benedict, H. M.	Waynesboro, R. No. 1
Bingham, A. H.	St. Thomas
Bingham, W. O.	St. Thomas
Bikle, Philip	Chambersburg, R. No. 11
Bream, D. M.	Chambersburg
Brereton, O'Hara D.	Edenville
Burgner, M. K.	Chambersburg
Burgner, S. A.	Chambersburg
Cordell, D.	St. Thomas
Crawford, J. B.	Fayetteville
Crawford, T. H.	Fayetteville
Criswell, R. T.	Chambersburg
Diehl, Edgar B.	St. Thomas
Diffenderfer, C. R.	Edenville
Duke, D. R.	Chambersburg
Duke, B. F.	Chambersburg
Gehr, Harvey J.	Waynesboro, R. No. 1
Gelwix, Dr. John M.	Chambersburg
Gillan, C. Frank	St. Thomas
Gillan, G. G.	St. Thomas
Gillan, R. J.	St. Thomas
Heisey, S. A. & Bro.	Greencastle, R. No. 4
Hess, Daniel	Waynesboro
Hess, Paul G.	Mont Alto, R. No. 1
Hess, Ralph C.	Waynesboro
Hess, Ray B.	Mont Alto, R. No. 1
Hess, S. S.	Waynesboro
Hess, Willis A.	Mont Alto, R. No. 1
Horn, W. H.	Chambersburg, R. No. 10
Karns, J. H.	Chambersburg
Knode, J. H.	Chambersburg
Lambert, J. M.	Chambersburg, R. No. 6
Landis, D. L., Jr.	Chambersburg, R. No. 1
Latshaw, J. E.	Marion
Long, D. Edward	Chambersburg
Long, W. G.	Fayetteville
McAllen, R. W.	Fannettsburg
McIlvaine, J. S.	Fayetteville, R. No. 1
McLaughlin, S. O.	Fort Loudon
Miller, Clayton	Marion
Miller, D. L.	Waynesboro
Minehart, T. Z.	Chambersburg
Minich, W. L.	Waynesboro
Mish & Croft	St. Thomas
Nelson, D. H.	Chambersburg
Nicodemus, E. A.	Zullinger
Newcomer, J. W.	Waynesboro, R. No. 1

Omwake Brothers.....	Greencastle
Orr, B. G.....	Chambersburg
Phiel, Earl C.....	St. Thomas
Pomeroy, Ralph S.....	Chambersburg
Rahauser Brothers.....	Greencastle
Rearick, J. W.....	Chambersburg
Reisner, J. E.....	Shippensburg
Reed, Fred B.....	Chambersburg
Reichard, Charles W.....	Waynesboro
Renfrew, R. M.....	Fayetteville
Rhoades, J. M.....	Marion
Ritchey, Maurice.....	Chambersburg
Sharpe, Walter K.....	Chambersburg
Shetron, W. F.....	Chambersburg, R. No. 6
Shields, Charles E.....	Roxbury
Shields, Ira M.....	Chambersburg, R. No. 5
Shockey, Luther P.....	Chambersburg, R. No. 9
Skinner, H. W.....	Chambersburg
Smith, G. Walter.....	Smithsburg, R. No. 1, Md.
Smith, F. Arthur.....	Chambersburg, R. No. 10
Smith, J. H.....	Chambersburg
Snowberger, A. I.....	Waynesboro, R. No. 1
Stevenson Brothers.....	Midvale
Tolbert, Henry.....	Chambersburg, R. No. 11
Weaver, Edward A.....	Fayetteville
*Wertz, D. Maurice.....	Waynesboro
Wingert, J. K.....	Chambersburg
Wishard, W. H.....	Chambersburg, R. No. 9
Witherspoon, D. Erskine.....	Chambersburg, R. No. 9
Young, J. P.....	Chambersburg, R. No. 8
Zullinger, T. A.....	Chambersburg

Report of the President

On January 21, 1922, we formed our local organization, known as the Franklin County Horticultural Society. We had at the end of the year 1922, seventy-eight paid up members, representative, we think, of the best fruit growers of our county. Six meetings of the Society were held during the year. At these meetings we were favored with able speakers, representatives either of State College, or of the State Department of Agriculture. Perhaps the most popular and most successful of these meetings consisted of a tour through the southern part of our county, visiting and passing through five large orchards, those of Omwake Brothers, Ed. Nicodemus, Hess Brothers, D. M. Wertz and Phillip M. Bickle, all of whom are members of our Society. At this meeting there were present members and guests to the number of one hundred and thirty-five, representing seven different counties of the State of Pennsylvania and five adjoining states, the District of Columbia and the State of Oregon.

There is no one great thing that we can boast of as having accomplished during the past year. Our work has been largely educational and to a certain extent social. We have attempted little in the way of cooperative buying and selling, but we have gotten together at these meetings and have learned to know and to esteem each other. We are coming to realize that our interests are mutual, and that our operations

should be competitive only as to the quality and quantity of fruit produced.

I feel safe in saying that owing to the Franklin County Horticultural Society, the fruit growers of our section stand closer together, know each other better, and are in a better position today to entertain some movement looking toward a cooperative association than in the past.

Our Society is young but rather large for its age, having now 82 members. We are hopeful for the future as we expect to pass the one hundred mark before the end of the present year. We look forward to the continued encouragement and cooperation of the State Horticultural Association of Pennsylvania.

W. O. BINGHAM, *President.*

LANCASTER COUNTY FRUIT AND VEGETABLE GROWERS ASSOCIATION

OFFICERS

<i>President</i> , ELMER R. SNYDER	Elizabethtown
<i>First Vice-Pres.</i> , L. B. HUBER	Lancaster, R. 5
<i>Second Vice-Pres.</i> , ELMER J. WEAVER	Ronks
<i>Third Vice-Pres.</i> , J. W. ROOT	Manheim, R. D. 1
<i>Fourth Vice-Pres.</i> , ELIAS H. VOGEL	Lancaster, R. D. 3
<i>Secretary</i> , T. WARREN METZGER	Lancaster, Farm Bureau
<i>Treasurer</i> , S. E. FORRY	Ephrata, R. D. 1

MEMBERS

Barr, Frank S.....	Narvon
Bollinger, Jacob.....	Lititz, R. 1
Borry, E. E.....	Stevens, R. 2
Brossman, J. F.....	Ephrata
Brubaker, J. C.....	Lititz, R. 1
Bucher, E. B.....	Ephrata, R. 1
Ditzler, Jacob W.....	Lititz, R. 5
Enders, John F.....	Columbia, R. D.
Fair, Frank.....	Elizabethtown, R. 1
Felty, S. B. O.....	Millersville
Flory, Paul B.....	Pequea
Forry, S. E.....	Ephrata, R. 1
Furlow, Eber.....	Hopeland
Gise, W. H.....	Lancaster, R. 5
Good, Martin R.....	Blue Ball
Hacker, E. S.....	Ephrata
Harnish, C. H.....	Leola
Herr, C. H.....	Lancaster, R. 2
Herr, David S.....	Lancaster, R. 7
Hershey, C. Maurice.....	Gordonville, R. 1
Hershey, Hiram S.....	East Petersburg
Hess, Francis P.....	Lancaster, R. 7
Hostetter, Dr. J. E.....	Gap, R. 1
Huber, L. B.....	Lancaster R. 5
Kauffman, A. L.....	Ronks, R. 1
Lepole, Walter.....	Akron
Longenecker, J. E.....	Mt. Joy
Metzger, T. Warren.....	Lancaster
Moore, M. A.....	Lititz
Nolt, Harrison S.....	Columbia, R. 1

*Reist, John G.....	Mt. Joy
Root, J. W.....	Manheim, R. 1
Ruhl, H. F.....	Manheim
Snively, Henry B.....	Lititz, R. 5
Snyder, C. B.....	Ephrata, R. 1
Snyder, Elmer R.....	Elizabethtown
Stauffer, T. H.....	Lititz, R. 4
Stolfus, Isaac M.....	Ronks, R. 1
Vogel, Elias H.....	Lancaster, R. 3
Wenger, Monroe P.....	Denver
Wenger, G. P.....	Quarryville, R. 1
Wertsch, Edwin.....	Lititz, R. 5
Witmer, J. B.....	Lampeter
Zimmerman, H. S.....	La Park

Report at the Harrisburg Meeting

The Lancaster County Fruit Growers were organized eight years ago; three years ago we took in the Vegetable Growers thinking this would strengthen our society, which it did. We at first held about ten meetings per year but the past two years we cut down to a few important ones during the year.

The most important work of the society the past year was the affiliation with the State Horticultural Association as we all feel the report of the proceedings are very valuable. We purchased a large quantity of spray material and fertilizer last year at a very much reduced price, meaning a saving of many dollars to our members.

Another important piece of work was a demonstration of the control of apple scab in the orchard of one of our members, with the help of Dr. Nixon.

We were unfortunate in losing our President, Benjamin Huber, by death, so our society was not quite as active as in previous years. However, we had a paid up membership of fifty-four.

HARRISON S. NOLT.

Report of the Secretary

The Lancaster County Fruit and Vegetable Growers Association, under the presidency of Elmer R. Snyder, who recently became the orchardist at the Masonic Homes farms at Elizabethtown, looks forward to a successful year in 1923.

Though only two meetings were held during the year 1922, both were well attended and proved that the interest in modern orcharding is on the increase. The first meeting, held March 9, 1922, was presided over by Benj. Huber, who like the present president, coincidentally, was also the orchardist at the Masonic Homes, Elizabethtown. The Association was profoundly shocked during the past summer when the news of Mr. Huber's death reached them. Death occurred at the General Hospital, Lancaster, from appendicitis. He had been ailing for some time, but his condition suddenly became acute, and a last-minute operation failed to arrest the progress of the fatal disease. Mr. Huber's work at the Homes over the

past several years had given rich promise of future results, and his passing away leaves a void in the meetings and affairs of the Lancaster County Orchardist. His father, L. B. Huber, has long been one of the active figures in the association, and continues to give it his heartiest support.

At the March, 1922, meeting, the action toward affiliating with the State Association was reaffirmed on motion of Dr. J. E. Hostetter, of Gap, Pa. Prof. Hodgkiss, of Pennsylvania State College, was the feature speaker, dwelling on "Fruit Insect Control."

The second meeting of the year was held December 7, 1922, when the annual election took place, results as above stated. Dr. Fletcher spoke at this meeting on "Nursery Stock," stressing the importance of using better stock, more care in selection, and getting the best size trees, even though the cost be greater. At this meeting the President appointed a Purchasing Committee consisting of Monroe P. Wenger, Walter Lepold and C. B. Snyder to negotiate for spray materials to be bought by the members in a cooperative way.

The first meeting for 1923 was held February 5, when reports on fruit prospects showed everything quite promising on both apple, peach and the minor fruits. The Secretary at this meeting called attention to the need of getting all spray material orders in hand at this session, with the result that a clean-up was virtually accomplished. He stated also that the saving from cooperative buying was well apparent, when one of the members advised him that his arsenate of lead bought in a private way would have cost him at that time twenty-six cents per pound, as against eighteen cents when bought through the Association. This meant a visible saving on a 200-pound drum of \$16. The desirability of seeking more members was made plain by this statement, and no less the economy of membership on the part of those present.

Prof. Thayer, of State College, then spoke on "Apple Pruning," and gave a very helpful, practical talk, advocating the modified leader type of pruning as against the open center type in common advocacy ten years ago.

Mr. H. S. Nolt reported on the meetings of the State Association during State Farm Products Show week. He felt that Lancaster county had made a great mistake in not exhibiting as a county at the State Show, and others present affirmed this opinion.

After the meeting adjourned a large number of membership moneys was taken in, as well as enough spray orders to take up the amount of the blanket order that had been placed in December. While there is no compilation of these orders at hand at this writing, it is known they will exceed 5,000 pounds of arsenate of lead, 175 barrels of lime-sulphur and minor quantities of copper sulphate, Bordeaux powder, calcium arsenate, etc.

T. WARREN METZGER, *Secretary.*

LAWRENCE COUNTY FRUIT GROWERS ASSOCIATION

OFFICERS

President, S. R. HUEY	New Castle, R. 3
Vice-Pres., C. F. HARBISON	New Castle, R. 7
Secy.-Treas., J. A. BOAK	New Castle, R. 4

MEMBERS

Bell, Russell	West Middlesex
Benson, B. J.	New Castle, R. 8
Blair, T. W.	New Castle, R. 4
Boak, J. A.	New Castle, R. 4
Boyd, J. H.	461 E. Washington St., New Castle
Cummings, J. W.	New Wilmington
Curry, Edward	New Castle, R. 4
Drake, William	Volant, R. 3
Fullerton, A. H.	Edenburg
Gebhart, W. J.	New Castle, R. 8
Harbison, C. F.	New Castle, R. 7
High Hill Fruit Farm	Pulaski
Hopper, W. C.	New Castle, R. 4
Houk, B.	New Castle, R. 8
*Huey, S. R.	New Castle, R. 3
Hunt, Norman	New Castle, R. 4
Hunt, S. J.	New Castle, R. 4
Hunt, Lewis	New Castle, R. 4
Johnston, J. B.	New Wilmington, R. 1
Johnston, J. H.	New Wilmington, R. 1
Johnston, R. S.	New Wilmington, R. 1
Kildoo, Samuel	New Castle, R. 4
Kyle, David	New Castle, R. 8
Leslie, Merl	New Castle, R. 8
McMillan, W. L.	916 Morton St., New Castle
Noss, J. A.	New Castle, R. 5
Offut, N. A.	Volant, R. 1
Patterson, Geo. W.	East Brook
Reynolds, Amzi	New Wilmington, R. 63
Shirk and Baker	West Middlesex
Young, Fred	Elwood City, R. 1

THE LEBANON VALLEY COOPERATIVE FRUIT GROWERS ASSOCIATION

OFFICERS

President, IRWIN LONGENECKER	Palmyra
Vice-Pres., A. V. SUPLOT	Cornwall
Secy.-Treas., H. MEYER SNAVELY	Lebanon

MEMBERS

*Boltz, P. R.	Lebanon, R. 3
Bucher, Alvin	Myerstown, R. 4
Cassidy, John B.	Lebanon, R. 2
Freeman, W. C.	Cornwall
Heilman, Albert	Cleona
Heilman, J. R.	Lawn
Hertzler, D. R.	Richland
Hoke, Arthur	Cornwall
*Horst, J. M.	Lebanon, R. 3
Keiser, Carl	Cornwall
Krall, W. O.	Myerstown, R. 4
Liske, C. E.	Lebanon, R. 4
Longenecker, Irwin	Palmyra
Meek, John	Jonestown
Meyer, D. H.	Annville
Meyer, E. J.	Lebanon, R. 8
Miller, Albert D.	Lebanon, R. 3
Moyer, Joseph	Lebanon
Rabel, Amos	Lebanon, R. 5
Rank, William	Lebanon
Reist, A. E.	Palmyra, R. 2
Snavely, H. Meyer	Lebanon
Snavely, Misses	Lebanon, R. 8
Suplot, A. V.	Cornwall
Trump, Chas.	Lebanon
Winters, Cyrus	Lebanon, R. 8
Wolff, Paul	Myerstown
Yingst, John	Lebanon, R. 5

Report of President

The purpose of this Association is twofold, commercial and educational.

In the commercial field the Association buys all kinds of spray materials and fruit packages for its members. During the fruit season the growers cooperate in grading and packing fruit as nearly alike as possible, at their individual orchards; also in keeping prices uniform to the public. At the opening of the season the Association advertises the advantages of home grown fruit in the city papers and posters. The Association has applied to the State for a charter under the 1919 Act, in order to put our purchasing of materials on a strictly business basis and with the view of selling cooperatively in the future.

On the educational side we hold a number of meetings during the year in which we invite men from the college and from the State Department of Agriculture to discuss subjects

of fruit culture which interest the members. We also relate our own experiences in round table conferences.

There is a good local market for all fruit grown in the county. Some outside fruit is brought into the county each year and about an equal amount sold out of the county — that is, home grown fruit. Soil and climate conditions are favorable in the Lebanon Valley. We can grow good size and color and the highest quality fruit.

During 1922 there was the worst epidemic of apple scab ever experienced. Peach Yellows appear constantly but infected trees receive the axe as soon as suspected. Several growers use dusters with good results on peaches, but none are satisfied with results on apples. Several large power sprayers were bought during the State Products Show. All growers plan to do more thorough work in the orchard than ever before.

The orchards of Lebanon County range all the way from the home orchard of a few trees to seventy-five acres. There is some planting being done this year. Trees consist mostly of apple and peach with some plums, cherries and pears. The Stayman is most extensively planted apple; Elberta and Belle, peaches. The scale of future fruit planting depends largely on the success of present orchards in the next few years. Most of the growers are rather "young" in the business and must develop the future on the success of the present.

J. M. HORST, *President for 1922.*

LEHIGH COUNTY HORTICULTURAL SOCIETY

Organized March 16, 1923

OFFICERS

President, F. S. DICKENSHIED Zionsville
Vice-President, H. A. SCHANTZ Allentown, Lentz Bldg.
Secretary, A. L. HACKER Allentown, 517 Hamilton St.

MEMBERS

Bender, L. J. Allentown, R. 4
Benner, H. G. Coopersburg
Dickenshied, F. S. Zionsville
Free, W. A. Allentown, 1607 Chew St.
Gackebach, C. A. Orefield, R. 1
Hacker, A. L. Allentown, 517 Hamilton St.
Keppinger, B. M. Coopersburg, R. 2
Marsh, H. C. Allentown, 517 Hamilton St.
Mill, H. S. Allentown, 622 N. 6th St.
Schantz, H. A. Allentown, Lentz Bldg.
Schantz, Louis M. Orefield, R. 1
Schantz, M. L. Allentown, 1610 S. Albert
Shoemaker, C. C. W. Catasauqua
Shoemaker, D. W. W. Catasauqua
Schreiber, H. F. Zionsville
Snyder, O. E. Allentown, R. 3
Weinberger, J. H. Zionsville
Wolf, Joseph Fullertown

LUZERNE COUNTY HORTICULTURAL ASSOCIATION

Organized Feb. 16, 1923

OFFICERS

President, HOWARD LEWIS Pittston, R. D.
Vice-Pres., ARTHUR GAY Dallas, R. D.
Secretary, FRED HESS Nescopeck, R. D.
Asst. Secy., PERCY L. YOST Sugarloaf, R. D.
Treasurer, ADAM STOCK Wyoming, R. D.
Executive Committee, JACOB H. WINTERS Dallas, R. D.
C. F. JOHNSON Kis-Lyn
IRVIN CHAPIN Shickshinny, R. D.

MEMBERS

Coon, John Wyoming, R. D.
Coon, H. F. Wyoming, R. D.
Ellsworth, Oliver Dallas, R. D.
Gay, G. E. & Son Dallas, R. D. 3
Hess, Fred E. Nescopeck, R. D.
Hess, S. S., Manager Freeland
Johnson, C. F. Kis-Lyn
Kauffman, Harry Drums
Kitchen, G. W. Shavertown
Moore, A. C. Kingston, 45 Eley St.
Parrish, Elmer D. Dallas
Pierce, Harry W. Wilkes-Barre, Lock Box 196
Rebennack, Jacon Dallas, R. D.
Rozell, H. E. Pittston, R. D.
Ruggles, F. L. Dallas, R. D.
Seely, Walter E. Nescopeck, R. D.
Stock, Adam Wyoming, R. D.
Wheeler, C. B. Hunlock Creek, R. D.
Williams, David Wilkes-Barre, Box 251
Williams, John White Haven
Winter, J. H. Dallas
Winters, B. J. Dallas, R. D. 3
Yost, Percy L. Sugarloaf, R. D.

YORK COUNTY FRUIT GROWERS ASSOCIATION

OFFICERS

President, C. P. KIBBLER York
First Vice-Pres., L. E. HARTMAN Cly
Second Vice-Pres., C. M. WERNIG York
Secretary, J. BENTZ KAUFFMAN York, R. D. 7
Treasurer, HOWARD ANDERSON Stewartstown

MEMBERS

Allen, H. G. New Park
Anderson, H. M. New Park
*Anderson, H. W. Stewartstown
Anderson, Ralph W. Fawn Grove
Bear, Jacob R. York, R. D. 10
Bear, Jno. W. York, R. D. 10
Beck, C. F. York, R. D. 9
Beaverson, E. S. York, R. D. 7
Boyd, Guy H. York, R. D. 6
Boyd, Stephen G. York, R. D. 6
Brandt, Emory W. York, Box 666
*Brinton, H. C. Hanover, R. D. 6

Druck, Albert.....	Wrightsville, R. D. 2
Flora, Wm.....	Wrightsville
Gable, A. P.....	York, R. D. 6
Houston, M. T.....	Wrightsville, R. D. 2
Hykes, S. W.....	York, 1300 N. George St.
Jacobs, David.....	Manchester
Kauffman, A.....	York, R. D. 7
Kauffman, C.....	York, R. D. 7
Kauffman, E. F.....	York, R. D. 7
Kauffman, J. B.....	York, R. D. 7
Kibbler, C. P.....	York, 527 W. Market St.
King, Geo.....	York, R. D. 2
Knisley, R. A.....	Yoe
Lau, L. B.....	East Berlin, R. D. 2
Lau, L. E.....	East Berlin, R. D. 2
Lau, R. E.....	York
Lehman, Elias.....	York, R. D. 5
Linn, Harry.....	Seven Valleys
Loose, H. H.....	Menges Mills
Markey, Elmer J.....	York, R. D. 2
Markey, Melvin.....	York R. D.
Martin, A. C.....	Muddy Creek Forks
*Miller, Amos E.....	Hanover
Moore, Edward.....	Mount Wolf, R. D. 1
Raby, J. B., Jr.....	York, R. D. 6
Raver, Erwin C.....	York, R. D. 9
Schmidt, Jno. C.....	York, Box 666
Sener, L. G.....	Hellam, R. D. 1
Sidler, A.....	York, R. D. 9
Smith, S. A.....	Yoe
Stein, Geo. E.....	Wrightsville, R. D. 1
Stoner, Benjamin.....	Hellam
Stock, McClean.....	York
Swartz, Samuel.....	Spring Grove
Tarbert, D. F.....	Dallastown, R. D. 1
Weaver & Leas.....	York, R. D. 9
Weber, G. G.....	York
Wernig, Chas. M.....	York, R. D. 9
Winters, M. L.....	Hellam, R. D. 1
Zeigler, J. A. C.....	York, 1018 W. Locust St.

Report of the President

We are buying cooperatively and saved our members about \$900.00. We had a fruit growers auto trip last summer to Adams county and, with the fruit growers of Adams county, made an inspection of the various spraying demonstrations. We had no fruit show the past year but expect to have one this year.

C. P. KIBBLER, *President*.

WAYNE COUNTY FRUIT GROWERS ASSOCIATION

OFFICERS

<i>President</i> , BERT S. HULL	Waymart
<i>First Vice-Pres.</i> , W. H. BULLOCK	Honesdale
<i>Second Vice-Pres.</i> , HOMER BONEAR	Honesdale
<i>Secretary</i> , T. H. OLVER	Honesdale, R. 4
<i>Treasurer</i> , AMASA KEYES	Beach Lake

MEMBERS

Avery, Fred.....	Honesdale, R. 3
Bonear, Homer.....	Honesdale
Bullock, W. H.....	Honesdale
Emery, Harvey.....	Waymart, R. 2
Erk, Geo.....	Seelyville
Hicks, William.....	Honesdale, Star Route
Hull, Bert S.....	Waymart
Keyes, Amasa.....	Beach Lake
Kinsman, E. E.....	Honesdale, R. 2
Mohrman, Henry.....	Narrowsburg, N. Y., R. 1
Murray, Philip.....	Honesdale
Olver, T. H.....	Honesdale, R. 4
Pohle, W. C.....	Honesdale
Simons, R. B.....	Starling
Stephens, J. A.....	Honesdale

Report of Annual Meeting

The annual meeting of the Wayne County Fruit Growers' Association was held in Honesdale, Thursday, March 8, 1923. The principal speakers were Dr. S. W. Fletcher and Paul Thayer, both of Pennsylvania State College.

The following program of work was decided upon:

1st. To sponsor a demonstration orchard, supervised by the County Agent and Paul Thayer.

2d. To aid in establishing orchard spray rings as a means of better production.

3d. Endorsed work of apple marketing committee of six. Plans of this committee include a central packing house for Honesdale district.

4th. To recommend five standard varieties for future planting in the county, as follows: Baldwin, Spy, Stayman, McIntosh, Rome.

These form the program of endeavor for the coming year.

T. H. OLVER, *Secretary*.

OTHER COUNTY HORTICULTURAL SOCIETIES

There are several other county societies not yet affiliated with the State Association. Among these are:

Perry County Horticultural Society

<i>President</i> , DANIEL RICE	New Bloomfield, R. D. 1
<i>Secretary</i> , L. T. ROTHROCK	New Bloomfield

Lackawanna County Horticultural Society

<i>President</i> , WM. H. PECK	Scranton
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Wyoming County Horticultural Society

<i>President</i> , F. H. FASSETT	Meshoppen
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CONSTITUTION AND BY-LAWS OF COUNTY HORTICULTURAL SOCIETY

New County Horticultural Societies are being considered and requests come for sample constitutions and by-laws. The following may be of service:

Constitution

Article I. — **Name.** This organization shall be known as the Franklin County Horticultural Society.

Article II. — **Object.** The object of the society shall be to encourage the cooperation of the Fruit Growers of Franklin County for the protection and advancement of their common interests,

1st. — By securing and disseminating such scientific and practical information as shall promote the general advancement of the fruit growing interests of this county and shall tend to the improvement of the quality and quantity of our products.

2d. — By securing such improved facilities in transportation as shall tend to give us more expeditious and economical distribution.

3d. — By devising a plan of advertising and marketing which will develop and increase the demand for Franklin County fruit, and promote closer relations between grower and market.

4th. — And by endeavoring to obtain such improved system of crop reporting as shall furnish, through cooperation with other and similar societies and associations accurate information concerning production thereby enabling the fruit grower to know the exact situation.

Article III. — **Membership.** Any person may become a member of this society by making application and paying the sum of Two Dollars (\$2.00) which is deemed the annual dues for the current year.

Article IV. — The annual dues of this society shall be Two Dollars (\$2.00) payable to the Secretary at the January or annual meeting, for which the Secretary shall issue a receipt, which will constitute a certificate of membership for the succeeding year. One dollar of the amount of dues paid by each member shall be appropriated to secure membership in the State Horticultural Association of Pennsylvania.

Article V. — **Officers.** The officers of this society shall consist of a President, one Vice President, a Secretary, an Assistant Secretary, a Treasurer and an Executive Committee of five members, consisting of the President, Secretary, and three

other members, all of whom shall be elected at the annual meeting for the term of one year or until their successors are chosen.

Article VI. — **Quorum.** Seven members shall constitute a quorum for the transaction of business.

Article VII. — **Amendments.** The constitution and by-laws of the society may be amended at any regular meeting by a two thirds vote of the members present, a notice of the proposed amendment having been presented in writing at a previous meeting.

By-Laws

Article I. — **Duties of the President.** The President shall preside at all meetings of the society and have general supervision of its affairs.

Article II. — **Duties of the Vice President.** The Vice President shall preside at any meeting in the absence of the President, and may act on the Executive Committee in the case of the President's absence.

Article III. — **Duties of the Secretary.** The Secretary shall keep true and accurate minutes of each meeting of the society and have charge of its records and reports, he shall transcribe the minutes after their approval in a record book provided for that purpose.

He shall collect all dues from the members of the society, turning the same over to the Treasurer, taking his receipt for same, and shall perform such other duties as shall be assigned to him by the Executive Committee.

Article IV. — **Duties of the Assistant Secretary.** The Assistant Secretary shall have charge of the Secretary's work at the meetings in the absence of the Secretary.

Article V. — **Duties of the Treasurer.** The Treasurer shall receive and keep an accurate account of all funds belonging to the society, paying out the same only on order of the society signed by the President and Secretary. He shall make a report of receipts and disbursements at the annual meeting, or at any time at the request of the society.

Article VI. — **Duties of the Executive Committee.** The Executive Committee shall have general supervision of the affairs of the society, auditing all bills and accounts and carrying out the purpose of the society. They shall prepare the program for each meeting. They shall fill vacancies which may occur during the year.

Article VII. — **Meetings.** There shall be a regular meeting of the society on the second Tuesday of January, April, July and November, at 1:30 P. M. unless otherwise ordered by the Executive Committee.

The January meeting shall be the annual meeting. Special meetings may be convened by the Executive Committee at such times as they may appoint. The place of meeting shall be arranged for by the Executive Committee.

Article VIII. — **Installation of Officers.** All new officers shall assume the duties of office at the opening of the meeting immediately following the one at which they were elected.

Article IX. — **Order of Business.** Meeting called to order. Reading of the minutes of the previous meeting. Nomination of officers, January meeting. Election of officers, January meeting. Report of Committees. Deferred Business. Communications. New business. Discussion and addresses.

SPRAYING SCHEDULES FOR FRUIT

BY H. E. HODGKISS and C. R. ORTON, State College

Spraying Directions

TIME AND MANNER

Delayed Dormant. This is the first spray on apples, pears and cherries. Peaches must be sprayed while the buds are fully dormant to control leaf curl. Use a rather coarse drenching spray, aiming to wet the ends of the buds as the lice are in those places.

Blossom Pink. This is the important spray for scab on the stems of the young blossoms. Unless this is applied large numbers of young apples are likely to drop and in some varieties it may result in the loss of the entire crop. Aim to hit the blossom stems and leaves.


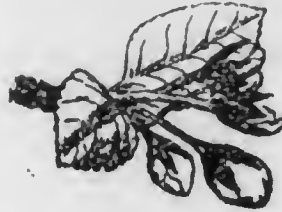
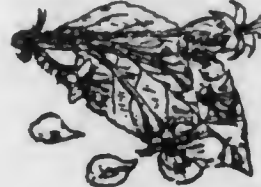


Petal Fall. The important spray for codling-moth and the first red-bug spray. Use a drenching spray to hit the red-bugs hiding in the terminal leaves and blossom clusters. Should be applied before the calyx closes in order to get the poison inside the calyx cup for codling-moth.

Cluster Apple. The second red-bug spray and important for diseases. Other sprays than lime-sulphur will russet the fruits at this time. Apply a rather drenching spray for red-bugs. Be careful not to drive the spray in one place too long or burning may result.

Midsummer. Important for fungous diseases on all fruits, codling-moth and late-feeding insects on apples.

Methods and Materials. Use 225 to 250 pounds pressure, with a spray gun. Be sure the engine has power enough to do the work. At least $2\frac{1}{2}$ horse-power is necessary and a larger engine is advisable.

APPLES

Period for spraying	Materials for 100 gallons of spray.	Diseases and Insects Controlled.
Delayed dormant 	Lime-Sulphur to test 1.03 Sp. G.; Black Leaf 40 $\frac{3}{4}$ pint; Arsenate of lead powder, 3 pounds.	San Jose, Oyster Shell and Scurfy Scales, Rosy Apple Aphis, Bud Moths, Leaf-rollers.
When leaves of blossom buds are out $\frac{1}{4}$ to $\frac{1}{2}$ inch.		
Blossom Pink 	Lime-Sulphur to test 1.008 Sp. G.; Arsenate of lead powder, 3 pounds.	Apple Scab, Frog-Eye, Bud Moths, Leaf-rollers, Curculio.
When blossoms show pink. At the separation of the cluster buds.		
Petal Fall 	Lime-Sulphur to test 1.008 Sp. G.; Black Leaf 40 1 pint; Arsenate of lead powder, 3 pounds.	Apple Scab, Frog-Eye, Codling Moth, Red Bug, Curculio.
When $\frac{2}{3}$ of the petals have fallen.		
Cluster Apple 	Repeat "Petal Fall" spray, or substitute Bordeaux 3-4-50 for Blotch.*	Apple Blotch, Scab, Frog-Eye, Red Bug, Curculio, Apple Maggot.
Ten days to two weeks later, or when the young apples are the size of hazel-nuts.		
Mid-summer 	Lime-Sulphur to test 1.008 Sp. G.; Arsenate of lead powder 3 pounds. Substitute Bordeaux for Blotch and Bitter Rot.*	Fruit Spot, Sooty Fungus, Apple Blotch, Bitter Rot, Codling Moth, Curculio, late apple worms.
Late in July or early in August.		

*If Blotch and Bitter Rot are present an extra application should be made using Bordeaux Mixture two weeks after the cluster apple spray.

PEACHES

Period for spraying	Materials for 100 gallons of spray.	Diseases and Insects Controlled.
Dormant	Lime-Sulphur to test 1.03 Sp. G.	Leaf Curl, San Jose Scale.

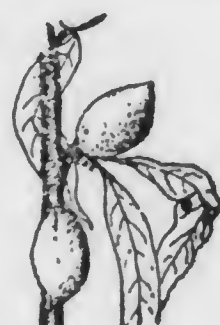


Before buds begin to swell in winter or spring.

Calyx Drop	Self-boiled Lime-Sulphur, Arsenate of lead powder 2 pounds.	Scab, Brown Rot, Curculio.
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When shucks are dropping.



Self-boiled Lime-Sulphur, Arsenate of lead powder 2 pounds.	Scab, Brown Rot, Curculio.
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Two or three weeks later.



Self-boiled Lime-Sulphur.	Brown Rot.
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Four or five weeks before fruit ripens.

PEARS

Period for spraying	Materials for 100 gallons of spray.	Diseases and Insects Controlled.
Cluster Bud	Lime-Sulphur to test 1.03 Sp. G.	Scab, Black Spot, Scale, Psylla eggs.



When blossom buds separate in the cluster.

Petal Fall

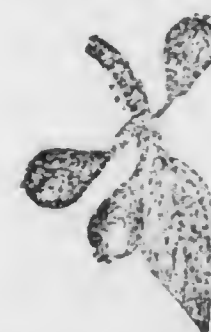


Lime-Sulphur to test 1.008 Sp. G.; Arsenate of lead powder 3 pounds; Black Leaf 40 1 pint; or if Psylla nymphs are abundant make a separate application of the nicotine and 4 pounds of dissolved soap.

Scab, Black Spot, Leaf Spot, Codling Moth, Psylla nymphs.

Just after petals are fallen.

Cluster Pear



Lime-Sulphur to test 1.008 Sp. G.; Arsenate of lead powder, 3 pounds.

Scab, Black Spot, Leaf Spot.

Two weeks after petal fall.

Emergency Spray





For Psylla nymphs. Apply when infestation is serious during summer.

Lime 30-60 pounds. Copper sulphate 2 pounds. Black Leaf 40 1 pint, water 100 gallons.





Summer brood of Psylla.

Flemish Beauty, Seckel, and other varieties subject to scab should receive the first three sprays; on Bartlett and Kieffer only the first two need be applied.

CHERRIES

Period for spraying	Materials for 100 gallons of spray.	Diseases and Insects Controlled
Delayed Dormant	Lime-Sulphur to test 1.03 Sp. G.; Black Leaf 40 1 pint or Black Leaf 40 1 pint., soap 4—5 pounds. (Sweet cherries only).	Scale, Aphis. Aphis.
		
When green ends of blossom buds show.		
Petal Fall	Self-boiled Lime-Sulphur, Arsenate of lead powder 2½ pounds.	Leaf Spot, Brown Rot, Curculio.
		
When petals fall.		
Calyx Drop	Self-boiled Lime-Sulphur, Arsenate of lead powder 2½ pounds.	Leaf Spot, Brown Rot, Curculio.
		
When shucks are dropped		
Fruit	Self-boiled Lime-Sulphur, Arsenate of lead powder 2½ pounds.	Leaf Spot, Brown Rot, Fruit Fly.
		
Just before cherries turn red.		
After picking.	Self-boiled Lime-Sulphur, Arsenate of lead powder 1-2 pounds.	Leaf Spot, Cherry Slug.

PLUMS

Period for spraying	Materials for 100 gallons of Spray.	Diseases and Insects Controlled.
Dormant	Lime-Sulphur to test 1.03 Sp. G.	San Jose Scale.
		
While buds are dormant.		
Calyx Drop	Self-boiled Lime-Sulphur, Arsenate of lead powder 2½ pounds.	Brown Rot, Leaf Spot, Curculio.
		
When shucks are dropped*		
	Self-boiled Lime-Sulphur.	Brown Rot, Leaf Spot.
		
Ten to twenty days later.		
	Self-boiled Lime-Sulphur.	Brown Rot, Leaf Spot.
		
Before fruit ripens.		

Where curculio is causing severe damages it may be advisable to apply an earlier spray in addition to this application. This spray should be made just after the blossom petals drop and using the same materials.

GRAPES

Period for spraying	Materials for 100 gallons of spray.	Diseases and Insects Controlled.
Just before buds open.	Bordeaux Mixture 8-8-100, Arsenate of lead powder 1½ pounds.	Anthracnose, Flea Beetles, Powdery Mildew, Dead Arm.
Just before blooming.	Bordeaux Mixture 8-8-100.	Downy Mildew, Powdery Mildew, Black Rot, Anthracnose.
Just after fruit has set.	Bordeaux Mixture 8-8-100, Arsenate of lead powder 3 pounds. Resin fish oil soap 3 pounds.	Rots, Berry Moth.
About ten days later.	Bordeaux Mixture 8-8-100.	Rots, Root Worm.
In about two weeks.	Bordeaux Mixture 8-8-100.	Rots, Root Worm.
When most nymphs are present (July 10-15).	Bordeaux Mixture 8-8-100, Black Leaf 40 ½ pint.	Leaf-hoppers.
When beetles are present.	Lead arsenate powder 2 pounds, cheap molasses 2 gallons.	Rose Chafer.

HOME-MADE LIME-SULPHUR CONCENTRATE

Quicklime (freshly burnt, 90% or over CaO) 45 lbs.
Sulphur (powdered commercial)..... 90 lbs.
Water to make..... 60 gals.

Place part of the water in cooker and start fire or steam. Add lime and sulphur, preferably sifting the later in, if lumpy. After slaking is well started, add remainder of water gradually but as soon as possible without unduly checking the boiling. Keep volume at or above the 60-gallon mark during as much of the cooking as possible. Stir vigorously during the cooking to keep sulphur pellets broken up. Mild or moderate boiling usually gives better results than violent boiling. The cooking is finished when the sulphur is all dissolved, as indicated by the practical disappearance of the fine sulphur granules in the solution. This usually requires 40 to 50 minutes of boiling.

These directions properly carried out should give a solution testing 1.23 to 1.25 on the specific gravity hydrometer or 27 to 29 degrees Baume. The variations, however, are sufficiently large and numerous to require definite testing of all home-made concentrates before any accurate dilution can be made. This can be readily done with a lime-sulphur hydrometer, which can be obtained from any of the principal hydrometer manufacturers, at a cost of \$1.00 to \$1.50 for a complete outfit.

Solutions of greater density than those given by the present formula can readily be obtained by reducing the final volume, but they are less efficient in their utilization of the lime and sulphur, and hence less desirable in home preparation. This solution should have practically no coarse sediment, and should become, on standing, about 60% to 80% clear of the very fine, smoky sediment. The fine sediment should give no trouble in any ordinary spraying, if uniformly distributed through the concentrate in which it was produced, when the latter is diluted for use. If this is not done, and only the clear solution above the sediment is used, some provision should be made for washing or otherwise separating the good solution out of the accumulations of sediment in the settling tank and thus securing the maximum value of the home preparation.

DILUTING LIME-SULPHUR CONCENTRATE HYDROMETER TEST

The strength of concentrate lime-sulphur varies so widely that it is unsafe to say 1 to 8 or 9, and 1 to 32 or 40. The expression "dilute to test 1.03 and 1.008" is used to indicate the correct strength for dormant and summer sprays respectively. This does not mean that every tank of material should

be tested. When the strength of the concentrate is known, (a thing necessary for accuracy and safety), divide the decimal of the concentrate by the decimal of the desired spray. For example, if the concentrate shows a density of 1.24 and we are spraying for scab in the Blossom Pink, which requires a spray of a density of 1.008, divide the .24 by .008 which gives the quotient of 30. This is the total number of volumes to which the concentrate 1.24 is to be diluted, and for practical purposes dilute at the rate of 1 to 30. Other dilutions are figured in the same manner.

If dry lime-sulphur is preferred, more than the manufacturers usually recommend should be used. If the manufacturers recommend 12½ pounds of the dry lime-sulphur to 50 gallons of water, about one-third more should be used in order to obtain results equal to the liquid material, in the control of San Jose scale, when diluted to 1.03. Every gallon of the diluted spray solution should contain 4.75 ounces of sulphur in order to be effective against the San Jose scale.

SELF-BOILED LIME-SULPHUR

This material should not be confused with the regular lime-sulphur solution produced by definite cooking or heating from outside sources. Self-boiled lime-sulphur is essentially a mixture of lime and sulphur, with a very slight development of sulphur solution, and the only heat used is that developed by the slaking lime. It is a very mild fungicide, for use chiefly on the peach and the more tender varieties of plums during the growing season.

Quicklime (freshly burnt, 90% or over CaO) 8 lbs.
Sulphur..... 8 lbs.
Water to make..... 50 gals.

Any other amounts, up to 200-gallon quantities, may be made at one time without reduction in quality. The lime is placed in a barrel and just enough water is added to start slaking properly. As soon as the slaking is well started, stir in the sulphur, sifting it if necessary to break up lumps, and adding more water as needed to render the mixture easily stirred. Continue actively stirring until slaking is complete. Allow it to stand until the reddish sulphids begin to appear; then dilute it at once to the full volume and use immediately, or at least add enough water to cool the mixture and thus check all further chemical action. This last mixture may then be diluted and used before any red colors appear.

The diluted material should be strained through a coarse sieve — about 20 meshes to the inch — to remove lumps in the lime, and kept thoroughly agitated during the spraying. Large, coarse disk nozzles and plenty of pressure are advisable in applying this spray.

DRY-MIX LIME-SULPHUR

This is the new spray that is likely to displace self-boiled lime-sulphur for the summer spraying of peaches, plums and cherries. Formula:

8 lbs. Superfine sulphur 4 lbs. hydrated lime
½ lb. calcium caseinate (Any casein spreader).

These are mixed together dry and used in 50 gallons of water. Powdered arsenate of lead is added to the mixture at the usual strength, either before or after it is put into the spray tank.

BORDEAUX MIXTURE

Copper sulphate (bluestone)..... 8 lbs.
Quicklime (freshly burnt, 90% or over CaO) 8 lbs.
Water to make..... 100 gals.

This material may be prepared either directly or from "stock solutions". In the former case, dissolve the copper sulphate in 4 or 6 gallons of water, and slake the lime carefully in a separate vessel with only enough water to avoid either caking or "drowning". Then dilute each of the materials to one-half the volume of spray to be made — 50 gallons each in the present case — and pour them together at the same time into strainer or barrel, or pour the diluted lime into diluted sulphate solution.

If it is impracticable to dilute each ingredient to half the total volume, then dilute the copper sulphate solution to about ⅔ of this volume in the spray tank, and strain the milk of lime into it with as much dilution as practicable. Stir the mixture thoroughly and add water to make the required volume. Never pour the ingredients together before diluting at least one of them, and it is preferable to dilute both. Use only wooden or earthen vessels in making this material, as iron and similar vessels are seriously corroded by it. The insecticide should then be added and the mixture should be used at once, as it deteriorates on standing, and the fresh preparation is always the most efficient.

For extensive spraying, stock dilutions of the two ingredients may be made as follows:

(From Extension Circular 94, Penna. State College)

Place two fifty-gallon barrels close to the water supply. *Save all the time and labor possible in handling the water. This is the most difficult part of spraying.* Second weigh up, don't guess, 50 pounds of copper sulphate in a clean burlap sack and fasten as near to the top of one of the barrels as possible, by drawing the top of the sack over the edge of the barrel and nailing it there. As near to the top of the barrel as possible is not a foot or two down in the barrel.

Fifty pounds of copper sulphate will not dissolve in 50 gallons of water unless the copper sulphate is kept near the top of the water. Next, fill the barrel with water. The above operation should be done at least several hours before one is

ready to spray in order to allow time for the copper sulphate to dissolve. The evening before is preferable. When the copper sulphate is dissolved, there will be 50 pounds of copper sulphate in solution in 50 gallons of water, or one pound per gallon. This is the proportion that should be constantly retained. In this form it will keep all summer; merely add enough water to allow for the evaporation which takes place between sprayings.

Slaking the Lime. In spraying more difficulty is experienced from improperly slaked lime than from all other causes. First, weigh up 50 pounds of good stone lime and put it into the other fifty-gallon barrel. Have a fairly heavy piece of seasoned hickory or other hard wood, at least five feet long and sharpened at one end, for stirring. Nothing is worse to clog nozzles than the fiber which invariably comes off soft wood when used for this purpose. Second, sprinkle or splash the water on the lime slowly until the pieces begin to break. Then add the water just rapidly enough to prevent the formation of dust. Stir enough to prevent the caking of the lime on the bottom of the barrel. After the violent boiling is over, the material should have the consistency of mush. This plastic condition is a critical stage in the slaking of lime.

The lime in this form should be stirred from one side to the other until it is as smooth as butter. Now fill the barrel with water and stir until all the pasty mass has completely disintegrated. The barrel now contains 50 pounds of stone lime in 50 gallons of water, or one pound per gallon. Like the copper sulphate solution the lime in this form will keep all summer; merely add sufficient water to replace what evaporates between sprayings. These operations may seem long and tedious but, when a good grade of stone lime is used, the entire operation will not require more than 30 minutes. These two stock solutions will flow like water and will not clog the nozzles if the above precautions are used. The two barrels will contain enough stock solution to make 625 gallons of Bordeaux mixture.

PEACH TREE-BORER CONTROL

H. E. HODGKISS, State College

During the last two or three years there has been developed a new and efficient remedy for peach borers. This is obtained through a chemical known as Para-dichlorobenzene, which is applied in a ring around the trees.

Para-dichlorobenzene is a crystalline product, which produces a gas heavier than air. It is very toxic to insects, but does not appear to be harmful to man in handling it. It is rather volatile at ordinary temperatures, but is insoluble in water. These factors make it an extremely desirable fumigant.

Time for Treatment — For trees six years and older treatments are made preferably about September 10th to Septem-

ber 30th. Material applied as late as October 15th has caused no injury to peaches in New Jersey. In the southern counties applications as late as October 15th will be more efficient.

Trees three to five years old may be safely treated if the Para-dichlorobenzene is removed within 14 days. Prolonged treatments to young trees may result in serious injuries.

Dosage — Use $\frac{1}{2}$ to $\frac{3}{4}$ of an ounce of the chemical to each tree.

Cost — This averages about 3 or 4 cents per tree for the maximum dosage including labor and materials.

Method of Application — Remove all weeds and stones from around the trees, cover any roots which may be showing above the ground, and if the sawdust from the borers, or the gum caused by the borers at the base of the trees is above the surface of the ground, bank earth up to and covering the gum. Before making this bank, the soil around the trees should be scraped to break the crust, but not to make the earth too loose. After leveling the surface to the bank place a ring of Para-dichlorobenzene about two inches from the trunk in a band about one inch wide. The material should not be placed nearer the tree than one inch, otherwise harm will result. It should not come in contact with any part of the tree. After the material has been placed around the tree, cover it with soil to a small depth, not too great, and bank this up to the tree, taking care not to throw the soil on so heavily that the chemical will be forced against the tree. Pat this down lightly to compact the earth, which will complete the operation. This may stay for several weeks, but should be removed before cold weather sets in in the fall to prevent any possibility of the material which has not become dissolved injuring the tree during winter.

HOME-MADE NICOTINE SPRAYS

(From Farmers' Bul. 908, U. S. Dept. Agr.)

Tobacco decoctions may be prepared readily at home, and, although varying somewhat in strength, will give as satisfactory results as the commercial products unless used too weak. The practicability of making the nicotine sprays will depend chiefly upon the availability and cost of the refuse tobacco. Tobacco stems, sweepings, and damaged tobacco are the most economical for this purpose and the dark types of tobacco, owing to their relatively high nicotine content, are preferable to light-colored tobacco. If a desirable type of refuse tobacco can be purchased for \$20 or less per ton, the fruit grower can make nicotine sprays at a cost of about 1 cent per gallon, exclusive of labor. The first cost of the tobacco waste is reduced by about one-half, since, after the nicotine has been extracted, the tobacco still has a fertilizer value of about \$10 per ton.

The amount of refuse tobacco necessary to give a spray containing 0.05 or 0.06 per cent of nicotine (the strength of

the diluted spray) will vary considerably as will be noted in the following table adapted from Bull. 208 of the Virginia Agricultural Experiment Station.

Formula for Making Nicotine Extracts

Kind of tobacco	From —	Nicotine	Number of pounds per 100 gallons necessary to make solutions containing different percentages of nicotine	
			Per cent	0.06 p. ct. 0.05 p. ct.
Light stems.....	Richmond, Va.....	0.481	145	121
".....	Danville, Va.....	.609	110	91
Sweepings.....	".....	.884	74	62
N. L. Orinoco.....	Appomattox, Va.....	5.535	12¼	10½
Olive.....	Powhatan, Va.....	3.367	19½	16¼
Light.....	Danville, Va.....	2.984	22	18
Sweepings.....	Louisville, Ky.....	.753	91	85
Smoker.....	Chatham, Va.....	2.306	28¼	23½
Wrapper.....	".....	3.05	21½	18
Cutter.....	".....	3.466	19	15
Dark.....	Appomattox, Va.....	2.835	23¼	19¼
N. L. Orinoco.....	Bowling Green, Va....	5.629	11¼	10
Medium smoker.....	Chatham, Va.....	3.766	17½	14½
Common smoker.....	".....	2.47	26	21½

Since it is impracticable for the fruit grower to have the refuse tobacco chemically analyzed, he should approximate the class to which it belongs and use according to the foregoing table. The chief danger lies in making the solution too weak. If made stronger than necessary, no damage to the plant will result.

Methods of Making. One of the most convenient as well as satisfactory methods of making nicotine sprays on the farm is by simply soaking the tobacco in the full quantity of water, with occasional stirrings, for a period of 24 hours. About 70 to 80 per cent of the nicotine will be extracted. After straining the tobacco solution to remove the particles of leaves and stems, it is ready for use.

The tobacco spray may also be made in a lime-sulphur plant equipped with steam. Place the proper amount of tobacco and water in the cooker and release the steam, and, as soon as the water reaches the boiling point, shut off the steam. As soon as the solution has cooled, it is ready to use. By this method about the same percentage of nicotine is extracted as by the soaking process. The solution should never be boiled, as the nicotine is volatile.

Nicotine sprays should not be made up until they are to be used, since fermentation begins within two or three days, perhaps spoiling them for spraying purposes.

The home-made nicotine solutions, when prepared as above at the strength indicated, will give control of most aphids. But as a matter of precaution it will be advisable to observe the effect of the spray upon the insects, and, if not effective, to strengthen it.

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Crosman, L. H.	Oaks	Montgomery
*Crouse, E. A.	Gettysburg	Adams
Crowell, A. & T.	Avondale	Chester
Crowell, Samuel B.	Edgemont	Chester
Cruze, George	Bloomsburg, 144 E. 5th St.	Columbia
*Cummings, Joseph F.	Sunbury	Northumberland
Cummings, J. W.	New Wilmington	Lawrence
Curry, Edward	New Castle, R. 4	Lawrence
Curry, Joseph P.	Parksburg	Chester
Darlington, H. D.	West Chester	Chester
*Davenport, Eugene	Plymouth	Luzerne
Davis, William	York Springs	Adams
Deardorf, Anthony	Gettysburg	Adams
Deardorf, Chas.	Orrtanna	Adams
Debenham, C. C.	Jersey Shore	Lycoming
Decker, H. B.	East Stroudsburg	Monroe
DeCou, Benjamin S.	Norristown, R. 1	Montgomery
Degleman, William	Bridgeville, R. 2	Allegheny
Deiner, W. S.	Boyertown, R. 2	Berks
DeLong, Cletus Y.	Mertztown, R. 2	Berks
DeLong, W. D.	1311 Good St., Reading	Berks
Dennis, R. M.	Carlisle	Cumberland

* Life Members.

Name	Post Office	County
Derick, T. A.	Newville	Cumberland
Devlin, Thomas	Langhorne	Bucks
Dickenshied, F. S.	Zionsville	Lehigh
Dickey, Samuel	Oxford	Chester
*Dickson, B. M.	5711 Elgin Ave., Pittsburgh	Allegheny
Diehl, Ed. B.	St. Thomas	Franklin
Dietrick, H. G.	Hunterstown	Adams
Dietz, Alex	Hellam	York
Diffenderfer, C. R.	Edenville	Franklin
Dill, Dr. M. T.	Orrtanna	Adams
*Dill, Robert	Northeast	Erie
Diller, O.	York Springs	Adams
Ditzler, Jacob W.	Lititz, R. 1	Lancaster
Dock, Miss Margaret	Fayetteville	Adams
Dock, Miss Mira L.	Fayetteville	Adams
Doty, H. M.	Stony Creek Mills, R. D.	Berks
Doty, Richard	Stony Creek Mills	Berks
Dougherty, Dorsay	Gettysburg	Adams
Drake, William	Volant, R. 3	Lawrence
Druck, Albert	Wrightsville, R. 2	York
Dudley, D.	Kingston	Luzerne
Dudley, Howard N.	Bustleton	Philadelphia
Duke, D. R. & B. F.	Chambersburg	Franklin
Dull, John	222 Butler Ave., Ambler	Montgomery
Dull, Thomas D.	Aspers	Adams
Duncan, D. G.	Shippensburg	Cumberland
Dunlap, Geo. P.	Mgr. Hillwood Frt. Fm., Glen Riddle	Dela.
*Dunlap, James M.	Shippensburg	Cumberland
*Dunlap, R. Bruce	Holidaysburg	Blair
Duriff, G. M.	Wellsboro	Tioga
Eagleman, J. G.	Geigers Mills	Berks
Eiholtz, S. Mc.	Biglerville	Adams
Eisenbrown, Robert W.	Gouglerville	Berks
Elder, George K.	Lewistown, Maine	
*Eldon, Robert M.	Aspers	Adams
Ellsworth, Oliver	Dallas, R. D.	Luzerne
Ely, Reuben P.	New Hope	Bucks
Emery, Harvey	Waymart, R. 2	Wayne
Ench, W. K.	Biglerville	Adams
Enders, J. F.	Columbia, R. 2	Lancaster
*Engle, Enos B.	Harrisburg	Dauphin
*Engle, John G.	Marietta	Lancaster
Eppleman, H. C.	Aspers	Adams
Erk, George	Seelyville	Wayne
Eshleman, S. C.	McKnightstown	Adams
*Espe, August G.	Perryville	Allegheny
*Evans, W. H.	Plainsville	Luzerne
Everhart, George W.	York	York

* Life Members.

Name	Post Office	County
Fagan, F. N.	State College	Centre
Fair, Frank	Elizabethtown, R. 1	Lancaster
*Fassett, F. H.	Meshoppen	Wyoming
Fellenbaum, A. H.	Gardners	Adams
Felty, G. B. O.	Millersville	Lancaster
Fenstermacher, Harry E.	Allentown, R. 3	Lehigh
Fenstermacher, P. S.	Allentown	Lehigh
Fetterman, J. Gordon	Media	Delaware
Fidler, W. B.	Aspers	Adams
*Filbert, R. J.	Fox Chase	Philadelphia
Finn, A. O.	Clifford	Susquehanna
Fleming, T. H.	Andalusia	Bucks
Fleming, W. M.	237 17th Ave., N., Seattle, Washington	
*Fletcher, S. W.	State College	Centre
Flora, Wm. H.	Wrightsville	York
Fohl, Geo. C.	Biglerville	Adams
*Ford, A. E.	Glenn Riddle	Delaware
Forry, S. E.	Ephrata, R. 1	Lancaster
*Fox, Cyrus T.	Reading	Berks
Freasy, Luther P.	Catawissa	Columbia
Fraim, Merritt L.	Aspers	Adams
Free, W. A.	Allentown, 1607 Chew St.	Lehigh
*Freed, A. J.	Racine	Beaver
*Freed, W. A.	Racine	Beaver
Freeman, W. C.	Cornwall	Lebanon
Friend Manufacturing Co.	Gasport, N. Y.	
From, W. H.	Sinking Spring	Berks
Frost, S. W.	Arendtsville	Adams
Fry, John L.	c-o C. K. Whitner & Co., Reading	Berks
Fullerton, A. H.	Edenburg	Lawrence
Funk, Blair	Pequea, R. 1	Lancaster
Funk, J. K.	117 E. Franklin St., Hagerstown, Md.	
Funk, Sheldon	Boyetown	Berks
Furlow, Eber	Hopeland	Lancaster
Galbreath, Dr. J. Willis	1923 Chestnut St., Phila.	Montgomery
Gable, A. P.	York, R. 6	York
Gardner, L. M., Jr.	York Springs	Adams
Garrahan, C. E.	Kingston	Luzerne
Garrahan, D. T.	Kingston	Luzerne
Garrahan, F. H.	Kingston	Luzerne
*Garrahan, R. H.	Kingston	Luzerne
Garretson, Frank	Aspers	Adams
Garretson, Eli	Gettysburg, R. 5	Adams
*Garretson, Eli P.	Biglerville	Adams
Garretson, John	Aspers	Adams
Garretson, Lloyd W.	Biglerville, R. 2	Adams
Garretson, Robert	Flora Dale	Adams
Gates, G. H.	Shippensburg	Cumberland

* Life Members.

Name	Post Office	County
Gay, G. E. & Son	Dallas, R. 3	Luzerne
Gebhart, W. J.	New Castle, R. 8	Lawrence
Gehr, Harvey J.	Waynesboro, R. 1	Franklin
Geigley, Amos	Orrtanna	Adams
Geigley, G. W.	Orrtanna	Adams
Gelwicks, Dr. John M.	Chambersburg	Franklin
George, I. E.	New Castle, R. 1	Lawrence
George, Thomas K.	Homer City	Indiana
Gideon, George D.	240 N. 16th St., Philadelphia	Philadelphia
Gillan, C. F.	St. Thomas	Franklin
Gillan, G. G.	St. Thomas	Franklin
Gillan, L. G.	137 Main St., Mt. Holly, N. J.	
Gillan, R. J.	St. Thomas	Franklin
Gise, Willis H.	Lancaster, R. 5	Lancaster
Glass, S. J.	Bulger	Washington
Glick, Jacob R.	Lancaster, R. 5	Lancaster
Goldsborough, E. L.	Shepherdstown, W. Va.	
Goldsborough, H. B.	Shepherdstown, W. Va.	
*Good, C. W.	Waynesboro	Franklin
Good, Martin R.	Blue Ball	Lancaster
Good, S. H. & Son	Lancaster, R. 7	Lancaster
Goshorn, Taylor L.	Quincy	Franklin
Graybill, I. G.	Refton	Lancaster
Griest, A. W.	Flora Dale	Adams
*Griest, C. A.	Guernsey	Adams
*Greist, Frederick E.	Flora Dale	Adams
Greist, Maurice	105 W. 163d St., New York, N. Y.	
Groupe, Foster C.	Gardners	Adams
*Grove, W. E.	York Springs	Adams
Guyton, Thomas L.	Harrisburg, Dept. of Agr.	Dauphin
Hacker, E. S.	Ephrata	Lancaster
*Haddock, John C.	Wilkes-Barre	Luzerne
Hager, Mrs. Mary W.	Lancaster, R. 8	Lancaster
Haines, Robert B., 3d	130 East Main St., Moorestown, N. J.	
Haines, Dr. W. A.	Bristol	Bucks
Hainley, J. N.	Ephrata, R. 2	Lancaster
*Hall, L. C.	Fairview	Erie
Harbison, C. F.	New Castle, R. 7	Lawrence
Hardt, C. W.	2245 N. 2d St., Harrisburg	Dauphin
Haring, S. A.	901 N. 11th St., Reading	Berks
Harnish, C. H.	Leola	Lancaster
Harnist, James B.	Sinking Springs	Berks
Harrison, G. Hale	Berlin, Md.	
Harshman, D. E.	Waynesboro	Franklin
Hartman, Aaron	Lebanon, R. 8	Lebanon
Hartman, Charles	Biglerville	Adams
*Hartman, D. L.	Cly	York
*Hartman, Geo. R.	Biglerville	Adams

* Life Members.

Name	Post Office	County
Hartman, Dr. G. W.	801 N. 3d St., Harrisburg	Dauphin
*Hartman, L. E.	Etters	York
Hartman, Robert	Biglerville	Adams
*Hartman, William	Etters	York
Hartzel, B. L.	Flora Dale	Adams
*Haverstick, Paul E.	Lancaster	Lancaster
*Hawkins, Charles A.	Delta	York
Hawkins, E. B.	Delta	York
Hayman, Guy L.	Northbrook	Chester
Hazlett, J. P.	Coopersburg	Lehigh
Heacock, F. J.	Bedford	Bedford
*Heard, R. E.	Buffalo, N. Y.	
Heberling, Herbert	Newburg	Cumberland
Heilman, Albert	Cleona	Lebanon
Heilman, J. R.	Lawn	Lebanon
Heilman, Dr. R. P.	140 W. 4th St., Emporium	Cameron
Heisey, J. A.	Camp Hill	Cumberland
Heisey, S. A. & Bro.	Greencastle, R. 4	Franklin
Heisey, S. C.	Elizabethtown	Lancaster
Henry, Harold	Shippensburg	Cumberland
Herr, C. H.	Lancaster, R. 2	Lancaster
Herr, David S.	Lancaster, R. 7	Lancaster
Herr, John D.	Reading	Berks
Herr, Wesley U.	Salona	Clinton
Hershey, C. A.	McKnightstown	Adams
Hershey, C. Maurice	Gordonville, R. 1	Lancaster
*Hershey, H. F.	Hamburg	Berks
Hershey, H. S.	East Petersburg	Lancaster
Hertzler, D. R.	Richland	Lebanon
Hess, Daniel	Waynesboro	Franklin
Hess, Francis P.	Lancaster, R. 7	Lancaster
Hess, Fred E.	Nescopeck, R. D.	Luzerne
Hess, Paul G.	Mt. Alto, R. 1	Franklin
Hess, Ralph C.	Waynesboro	Franklin
Hess, Ray B.	Mt. Alto, R. 1	Franklin
Hess, S. S.	Freeland	Luzerne
Hess, S. S.	Waynesboro	Franklin
Hess, Willis A.	Mt. Alto	Franklin
Hertzler, H. C.	Hancock, Md.	
Hewitt, Geo. F.	234 MacClay St., Harrisburg	Dauphin
Hicks, William	Honesdale, Star Route	Wayne
High, John S.	Pottstown, R. 4	Montgomery
High Hill Fruit Farm	Pulaski	Lawrence
Hile, Anthony	Curwensville	Clearfield
*Hill, William D.	Northeast	Erie
Hill, W. F.	Huntingdon	Huntingdon
Hiller, C. H.	Taconey	Philadelphia
Hinkle, Jacob E.	Oley, R. 1	Berks

* Life Members.

Name	Post Office	County
Hitz, Cyrus	Hummelstown, R. 2	Dauphin
Hochberg, Wm. H.	Verona, R. 1	Allegheny
Hocker, Clifford H.	Dauphin, R. 1	Dauphin
Hoffman, Ernest M.	Bloomsburg, R. 5	Columbia
Hoffman, D. M.	Biglerville	Adams
Hoffman, E. N.	Biglerville	Adams
Hoffman, Geo.	Arendtsville	Adams
Hoffman, James O.	Arendtsville	Adams
Hoffman, Paul	Gettysburg	Adams
Hoffman, Robert	Arendtsville	Lawrence
Hopper, W. C.	New Castle, R. 4	Chester
*Hoopes, Wilmer W.	West Chester	Lebanon
Hoke, Arthur W.	Cornwall	Franklin
Horn, W. H.	Chambersburg, R. 10	Lebanon
*Horst, J. Morris	Lebanon, R. 3	Lebanon
*Hostetler, Abram	Johnstown	Cambria
Hostetter, J. E.	Gap, R. 1	Lancaster
Houk, J. B.	New Castle, R. 8	Lawrence
Houston, M. T.	Wrightsville, R. 2	York
Howard, John M.	Arendtsville	Adams
Howe, Homer B.	Benton	Columbia
Huber, Chas. H.	Gettysburg	Adams
Huber, Levi B.	Lancaster, R. 5	Lancaster
Hudunt, Frank	Norristown, R. 2	Montgomery
*Huey, S. R.	Newcastle, R. 3	Lawrence
*Huff, Burrell R.	Greensburg	Westmoreland
*Huff, L. B.	Greensburg	Westmoreland
Hull, Bert S.	Waymart	Wayne
Hummel, P. T.	Harrisburg	Dauphin
Hunt, Norman	New Castle, R. 4	Lawrence
Hunt, Lewis	New Castle, R. 4.	Lawrence
Hunt, S. J.	New Castle, R. 4	Lawrence
Hunter, James C.	Werford	Allegheny
Hykes, S. W.	1300 N. Geo. St., York	York
Ide, Linford C.	Sweet Valley	Luzerne
Ivins, William A.	Media	Delaware
Jacobs, David	Manchester	York
Jacob, D. C.	Gettysburg, R. 5	Adams
James, Paxson V.	8029 Ridge Ave., Philadelphia	Philadelphia
Jefferson Cooperage Co.	Ranson, W. Va.	Luzerne
Johnson, C. F.	Kis-Lyn	Bucks
Johnson, Edwin	Taylorsville, R. 1	Bucks
Johnson, E. R.	Center Ridge	Luzerne
*Johnston, Mrs. F. C.	Dallas	Luzerne
Johnston, J. B.	New Wilmington, R. 1	Lawrence
Johnston, J. H.	New Wilmington, R. 1	Lawrence
Johnston, R. S.	New Wilmington, R. 1	Lawrence
Jones, A. J.	Dauphin, R. D.	Dauphin

* Life Members.

Name	Post Office	County
*Jones, J. F.	Lancaster	Lancaster
*Jones, S. Morris	West Grove	Chester
Jordan, George S.	Hall Tobacco & Chem. Co., 212 5th Ave, N. Y.	
Kane, D. R.	Elliottsburg	Perry
Kane, J. A.	Biglerville	Adams
Kane, J. Lewis	Gettysburg, R. 5	Adams
Karns, J. H.	Chambersburg	Franklin
Kaufman, Harry	Drums	Luzerne
Kauffman, A. & C.	York, R. 7	York
Kauffman, A. L.	Ronks, R. 1	Lancaster
Kauffman, E. B.	York, R. 7	York
Kauffman, J. B.	York	York
Kaufman, Samuel B.	Quinton	McKean
Keech, M. H.	West Chester	Chester
Keiser, Carl	Cornwall	Lebanon
*Keller, S. C.	Gettysburg, R. 5	Adams
*Keller, Paul J.	Gettysburg, R. 5	Adams
Kelly, Margaret	West Chester	Chester
Kennedy, Bailey M.	Dauphin	Dauphin
*Kessler, George W.	Tyrone	Blair
Keyes, Aamasa	Beach Lake	Wayne
Kibbler, C. P.	572 W. Market St., York	York
Kiefer, E. C.	York Springs	Adams
King, Geo.	York, R. 2	York
Kildoo, Samuel	New Castle, R. 4	Lawrence
King, K. C.	Morrisville	Bucks
Kinsman, E. E.	Honesdale, R. 2	Wayne
Kistler, J. M.	Stroudsburg	Monroe
*Kistler, U. G.	Etters	York
Kitchen, G. W.	Shavertown	Luzerne
Klahre, James E.	N. J. Fruit Growers Coop. As., Camden, N. J.	
Kleinfelter, U. S.	Biglerville	Adams
Kleppinger, B. M.	Coopersburg, R. 2	Lehigh
Knab, Mrs. Geo. N.	New Oxford	Adams
Knight, Paul	Torresdale	Philadelphia
Knisley, R. A.	Yoe	York
Knobel, E. M.	Sunbury, R. 1	Northumberland
Knode, J. H.	Chambersburg	Franklin
Knouse, J. A.	Arendtsville	Adams
Knouse, M. E.	Biglerville	Adams
Knouse, O. S.	Biglerville, R. D.	Adams
Koch, C. H.	McKeansburg	Schuylkill
*Koehler, Paulus E.	Monaca	Beaver
Koser, Rev. D. T.	Arendtsville	Adams
Koser, G. W.	Biglerville	Adams
Krall, Wm. O.	Myerstown, R. 4	Lebanon
Kruppinbach, Harry	Robesonia	Berks
Kuhn, C. E.	Cashtown	Adams

* Life Members.

Name	Post Office	County
Kunkle, John R.	Gettysburg	Adams
Kunkel, N. J.	Orwigsburg	Schuylkill
Kyle, David	New Castle, R. 8	Lawrence
Lachman, John	Mt. Oliver Sta., Pittsburgh	Allegheny
Lambert, J. M.	Chambersburg, R. 6	Franklin
Landis, D. L., Jr.	Chambersburg, R. 1	Franklin
*Landis, D. M.	Lancaster, R. 7	Lancaster
*Landis, Israel	Lancaster	Lancaster
Large, Mrs. E. S.	Orrtanna	Adams
Large, E. Spencer	Orrtanna	Adams
Latshaw, J. E.	Marion	Franklin
Lau, I. M.	Catawissa	Columbia
Lau, L. B.	East Berlin, R. 2	York
Lau, L. E.	East Berlin, R. 2	York
Lau, R. E.	York	York
Laub, H. H., Jr.	Lewistown	Mifflin
*Lawrence, Schuyler	109 Main St., Towanda	Bradford
Lawver, Rufus W.	Biglerville	Adams
Lehman, Elias	York, R. 5	York
Lenhart, Richard L.	Kline, Eppiheimer & Co., Reading	Berks
*Leonard, F. E.	Carlisle, R. 1	Cumberland
Lepole, Walter	Akron	Lancaster
Leshner, H. V.	Northumberland	Northumberland
Leslie, Merl	New Castle, R. 8	Lawrence
Leslie, George R.	Arnold	Westmoreland
Leute, H. S.	Barnesboro	Cambria
Lewis, Harvey D.	Orrtanna	Adams
Lewis, H. G.	Pittston, R. 1	Luzerne
Lewis, W. J.	Pittston	Luzerne
Lienhard, Edward	Lehigh, R. 2	Carbon
*Lightner, William A.	Landisburg	Perry
Linde, J. Eric	Orefield	Lehigh
Lindner, F. J.	Ringtown	Schuylkill
Linn, Harry	Seven Valleys	York
Linville, Arthur S.	Media, R. 2	Delaware
Lippy, J. D.	Gettysburg	Adams
Lisko, C. E.	Lebanon, R. 4	Lebanon
Livingood, W. W.	Robesonia	Berks
Long, D. Edward	213 Trust Bldg., Chambersburg	Franklin
Long, W. G.	Fayetteville	Franklin
Long, W. W.	Eighty Four	Washington
Longenecker, Harry	Ephrata, R. 1	Lancaster
Longenecker, J. E.	Mt. Joy	Lancaster
Longenecker Brothers	Palmyra	Lebanon
Longenecker, Irwin	Palmyra	Lebanon
Longsdorf, C. L.	Biglerville	Adams
*Loop, A. I.	North East	Erie
Loose, Erwin M.	Menges Mills	York

* Life Members.

Name	Post Office	County
Loose, H. H.	Menges Mills	York
*Lord, John	Wyoming, R. 1	Luzerne
Lovett, R. P.	Fallsington	Bucks
Loy, W. G.	Newport	Perry
Lucabaugh, J. W.	Hanover	Adams
Lupp, Reuben	Biglerville	Adams
Lute, H. S.	Barnesboro	Cambria
Lynn, W. C.	Bureau of Markets, Harrisburg	Dauphin
MacFlickinger, J.	Fannettsburg	Franklin
MacKenzie, G. W.	1831 Chestnut St., Philadelphia	Philadelphia
*Macneal, William H.	Parkesburg	Luzerne
McAllen, R. W.	Fannettsburg	Franklin
McCabe, H. Dallas	Monessen	Bedford
*McClelland, J. B.	Cannonsburg	Washington
*McCormick, James	Harrisburg	Dauphin
*McFarland, J. Horace	Harrisburg	Dauphin
*McGeorge, Katherine L.	Orrtanna	Adams
McGowan, P. A.	Williamsport	Lycoming
McIlvania, J. S.	Fayetteville, R. 1	Franklin
*McKee, J. M.	State Dept. Agr., Harrisburg	Dauphin
*McLanahan, J. King	Holidaysburg	Blair
McLaughlin, S. O.	Fort Loudon	Franklin
McMillan, W. L.	916 Morton St., New Castle	Lawrence
McMullen & Patterson	19 Dundaff St., Carbondale	Lackawanna
McNeal, Isaac B.	612 W. 13th St., Tyrone	Blair
*Maffet, Miss M. A.	264 S. Franklin St., Wilkes-Barre	Luzerne
Marble, L. M.	Canton	Bradford
Markeley, N. S.	Shanesville	Berks
Markey, Elmer J.	York, R. 2	York
Markey, Melvin	York, R. D.	York
Marsh, G. T.	Walbrook Apts., Baltimore, Md.	
Martin, A. C.	Muddy Creek Forks	York
*Martin, J. O.	Mercersburg	Franklin
Martin, J. Warren	Orrtanna	Adams
Mason, A. Freeman	Agr. Exp. Station, New Brunswick, N. J.	
Mason Drug & Chem. Co.	Hancock, Maryland	
Mauger, Maurice	Boyertown	Berks
*Mayer, Guy S.	Willow Street	Lancaster
Mayer, L. E.	Boyertown	Berks
Meck, John W.	Jonestown	Lebanon
*Meehan, S. Mendelson	Germantown	Philadelphia
Melcher, Bennett A.	Bally	Berks
Melcher, George W.	Bally	Berks
*Mendenhall, J. Howard	Glen Mills	Delaware
Merkel, Floyd	Hamburg	Berks
Mesta Brothers	Finleyville, R. 1	Washington
*Metzger, Dr. A. H.	LaFayette	McKean
Metzger, T. Warren	Lancaster	Lancaster

* Life Members.

Name	Post Office	County
Meyer, Charles L.	1519 Frick Bldg., Pittsburgh	Allegheny
Meyer, D. H.	Annville	Lebanon
Meyer, E. J.	Lebanon, R. 3	Lebanon
Meyer, Henry T.	Lewisburg	Union
Miller, Albert	Lebanon, R. 3	Lebanon
*Miller, Amos	Hanover, R. 4	York
Miller, A. D.	Lebanon, R. 3	Lebanon
Miller, Clayton	Marion	Franklin
Miller, D. L.	Waynesboro	Franklin
Miller, E. M.	Hanover	York
Miller, H. D.	Sinking Springs	Berks
Miller, Harvey	Loganville	York
Miller, W. M.	Lewisburg	Union
Mills, Elmer S.	Camp Hill	Cumberland
Minch, Walter L.	Bridgeton, N. J.	
Minehart, T. Z.	Chambersburg	Franklin
Minnich & Brother, D. N.	Chambersburg	Franklin
Minich, Homer R.	Lititz, R. 2	Lancaster
Minnich, W. L.	Waynesboro	Franklin
Minter, Thomas L.	Biglerville	Adams
Mish & Croft	St. Thomas	Franklin
Mitchell, J. C.	Hanover	York
Mohler, David G.	Ephrata	Lancaster
Mohrman, Henry	Narrowsburg, N. Y., R. 1	
Monosmith, S. B.	Weisel	Bucks
*Moon, Henry T.	Morrisville	Bucks
Moon, R. Barclay	Morrisville	Bucks
Moore, A. C.	45 Ely St., Kingston	Luzerne
Moore, Edward	Mount Wolf, R. 1	York
Moore, John W.	Norristown	Montgomery
Moore, W. C.	Millerstown	Perry
Mowery, N. E.	Shippensburg	Cumberland
Moyer, Dr. H. B.	Gettysburg	Adams
Moyer, Joseph	Lebanon	Lebanon
Moyer, Samuel	Hershey	Dauphin
*Muller, Adolph	Norristown	Montgomery
Murphy, S. H.	Kennett Square	Chester
Murray, Philip	Honesdale	Wayne
Musselman, C. H.	Biglerville	Adams
Musselman, Ivan Z.	Orrtanna	Adams
Musselman, John	Orrtanna	Adams
Musselman, S. Z.	McKnightstown	Adams
Muth, Harvey W.	Allentown, R. 3	Lehigh
Muttart, B. F., Sun Krest	Fruit Farm, Schwenksville,	Montgomery
Myers, C. E.	State College	Centre
Myers, Geo. P.	Aspers	Adams
Myers, J. M.	Westminster, R. 2, Maryland	
*Myers, Levi M.	Siddonsburg	York

* Life Members.

Name	Post Office	County
Myers, R. E.	York Springs	Adams
Nylin, Frank H.	Willow St., Lancaster, R. 1	Lancaster
Nass, J. A.	New Castle, R. 5	Lawrence
Nells, J. B.	1108 Penn St., Harrisburg	Dauphin
Nelson, D. H.	Chambersburg	Franklin
Nevin, John D.	Freemansburg Road, R. 3	Northampton
Newcomer, Aarop	Smithsburg, Md.	
Newcomer, J. W.	Waynesboro, R. 1	Franklin
Nichols, William	Bustleton	Philadelphia
Nicodemus, Ed.	Waynesboro	Franklin
Nissley, W. B.	State College	Centre
Nixon, E. L.	State College	Centre
Nolan, John V.	Malvern	Chester
Nolt, Harrison S.	Columbia, R. 1	Lancaster
Northup, H. J.	Dalton	Lackawanna
Oakwood Corporation	York Springs	Adams
*O'Conner, Haldeman	13 N. Front St., Harrisburg	Dauphin
Offut, N. A.	Volant, R. 1	Lawrence
Olver, T. H.	Honesdale, R. 4	Wayne
Omwake Brothers	Greencastle	Franklin
Oppenlander, E.	Coopersburg	Lehigh
Orchard Farm	Spring City	Chester
Orner, Harry	Aspers	Adams
Orner, I. S.	Arendtsville	Adams
Orr, B. G.	Chambersburg	Franklin
Orr, James W.	Frankford	Philadelphia
Orton, C. R.	State College	Centre
Oyler, George	Arendtsville	Adams
Oyler, Geo. C.	Gettysburg, R. D.	Adams
Oyler, W. L.	Gettysburg, R. 5	Adams
*Page, C. M.	Ely	York
*Pannebaker, William M.	Virgilina, Virginia	
Parker, Caroline R.	West Chester	Chester
Parker Co., Willard	Boyetown, R. 1	Berks
Parrish, Elmer D.	Dallas	Luzerne
Parthemere, Jacob	Lewisberry	York
Patterson, Geo. W.	East Brook	Lawrence
Passmore, N. S.	Chester Heights	Delaware
Patterson, James A.	Stewartstown	York
Patterson, W. J.	50 Water St., Pittsburgh	Allegheny
Pease Co., F. B.	Rochester, N. Y.	
Peck, William H.	c-o Third Natl. Bnk., Scranton	Lackawanna
Pelton, W. C.	State College	Centre
Pentz, Clinton L.	Camp Hill, R. 1	Cumberland
Pepple, Samantha	Orrtanna	Adams
Peris, Roy N.	Florin	Lancaster
Perkiomen Orchards	Norristown, R. 1	Montgomery
Perrigo, A. H.	West Chester	Chester

* Life Members.

Name	Post Office	County
Pershing, Theodore	Pineville	Bucks
Peters, Curtis W.	Biglerville	Adams
Peters, George M.	Aspers	Adams
Peters, Mrs. J. H.	Bendersville	Adams
Peters, John B.	Gardners	Adams
Peters, W. V.	Guernsey	Adams
Phiel, Clifford	St. Thomas	Franklin
Philip, Geo.	South Hills, Pittsburgh	Allegheny
Phillips, Chas. S.	Pocopson	Chester
Pierce, E. F.	Westgrove, Box 62	Chester
Pierce, H. H.	Wilkes-Barre	Luzerne
*Pierce, H. W.	Wilkes-Barre	Luzerne
Pitzer, Harry C.	Aspers	Adams
Pitzer, Willis	Arendtsville	Adams
Pohle, W. C.	Honesdale	Wayne
Pollock, G. B.	Wyoming, R. 3	Luzerne
Pomeroy, Ralph S.	Chambersburg	Franklin
Powell, H. B.	Clearfield	Clearfield
*Pratt, B. G.	c-o Pratt Chemical Co., New York, N. Y.	
Preston, J. Albert	Wernersville	Berks
Price, J. L.	13th & Sycamore St., Harrisburg	Dauphin
Prickett, J. W.	Biglerville	Adams
Rabel, Amos	Lebanon, R. 5	Lebanon
Raby, J. B.	York, R. D. 6	York
Raffensperger, Chas. E.	Arendtsville	Adams
Raffensperger, Harvey E.	Arendtsville	Adams
Raffensberger, Roy	Biglerville	Adams
Rahauser Brothers	Greencastle	Franklin
Randolph, W. C., Jr.	Monroe, Va.	
Ramer, O. G.	Pitman, R. 2	Schuylkill
Rank, Wm.	Lebanon	Lebanon
*Rankin, Charles C.	West Chester	Chester
Raver, Edwin C.	York, R. 9	York
Ray, J. E. S.	West Chester	Chester
Rearick, J. W.	Chambersburg	Franklin
Rebennaek, Jacon	Dallas, R. D.	Luzerne
Reisner, J. E.	Shippensburg	Cumberland
Reed, Fred B.	Chambersburg	Franklin
Reichard, Chas. W.	Waynesboro	Franklin
Reif, Jacob L.	Camp Hill	Cumberland
Reist, A. E.	Palmyra, R. 2	Lebanon
Reist, Henry G.	110 Avon Road, Schenectady, N. Y.	
*Reist, John G.	Mount Joy	Lancaster
Reiter, G. F.	Mars	Butler
Renfrew, R. M.	Fayetteville	Franklin
Rex, Raymond	Gardners	Adams
Reynolds, Amzi	New Wilmington, R. 63	Lawrence
Rhoades, J. M.	Marion	Franklin

* Life Members.

Name	Post Office	County
Rhodes, T. F.	Aspers	Adams
Rice, A. E.	Biglerville	Adams
Rice, Daniel	New Bloomfield	Perry
Rice, E. E.	Aspers	Adams
Rice, O. C.	Biglerville	Adams
Rice, C. S.	Arendtsville	Adams
*Rick, John	Reading	Berks
Riddlemoser, H. E.	McKnightstown	Adams
Rife, Jacob L.	Camp Hill, R. I	Cumberland
Riland, W. J. G.	Halifax	Dauphin
*Rinehart, E. S.	Mercersburg	Franklin
Risser, A. H.	Bainbridge	Lancaster
Risser, H. N.	Marietta	Lancaster
Ritchey, Maurice	Chambersburg	Franklin
Rittenhouse, Dr. J. S.	Lorane	Berks
Rittenhouse, S. B.	Lorane	Berks
Roberts, Arthur	McKnightstown	Adams
*Roberts, Horace	Moorestown, N. J.	
Roberts, J. Earle	220 Dock St., Philadelphia	Philadelphia
Roberts, Preston F.	Moorestown, N. J.	
Robertson, William	Oley, R. 2	Berks
*Robinson, A. Blaine	North East	Eric
*Rohde, William	Johnstown	Cambria
Roher, Geo. H.	Mertztown	Berks
Rohlfing, F. F.	Hummelstown	Dauphin
Romig Brothers	Downingtown	Chester
Root, J. W.	Manheim, R. 1	Lancaster
Rose, Wm. J.	No. 2 Pomfret Apts., Carlisle	Cumberland
Rossler, Chas.	Crafton, Box 64	Allegheny
Rowe, O. S.	Millersburg	Dauphin
Rozelle, H. E.	Pittston, R. D.	Luzerne
Ruggles, F. L.	Dallas, R. D.	Luzerne
Ruhl, Dr. H. F.	Manheim	Lancaster
*Runk, J. A.	Huntingdon	Huntingdon
*Rush, Perry M.	Sycamore, R. 1	Greene
Russell, S. W.	Bureau of Markets, Harrisburg	Dauphin
Sachs, Edwin S.	Biglerville	Adams
Saeger, Oscar J.	N. First St., Lehigh	Carbon
Sanders, Dr. J. G.	Bureau of Plant Ind., Harrisburg	Dauphin
Sargent, Geo.	Glen Mills	Lelaware
Satterthwaite, Fredk. G.	Fallsington	Bucks
Satterthwaite, Lewis P.	Newtown	Bucks
Schantz, M. P.	602 Hamilton St., Allentown	Lehigh
Schantz, H. A.	602 Hamilton St., Allentown	Lehigh
Schantz, L. M.	Orefield, R. 1	Lehigh
Schmidt, John C.	York, Box 666	York
Schellengerger, Jas. A.	434 N. 15th St., Allentown	Lehigh
Schneber, Harry E.	Old Zionsville	Lehigh

* Life Members.

Name	Post Office	County
Schnick, Casper C.	Zionsville, R. 1	Lehigh
Schmick, Wilson E.	Hamburg	Berks
Schoemaker, Seth W.	c-o International Correspondence School Scranton	Lackawanna
Schultz, Chester K.	Barto	Berks
*Schuyler, Lawrence	109 Main St., Towanda	Bradford
Scott, A. H.	Wallingford	Delaware
*Searle, Alonza T.	Honesdale	Wayne
Seely, Walter E.	Nescopeck, R. D.	Luzerne
Sener, L. G.	Hellam, R. 1	York
Sergeant, Geo. Jr.	Glen Mills	Delaware
*Settemeyer, C. T.	Wilmore	Cambria
*Shalleross, Frank R.	Frankford	Philadelphia
Shank, John H.	Lancaster, R. 7	Lancaster
*Shank, H. L.	c-o Conestoga Stage, Lancaster	Lancaster
*Sharpe, Miss E. M.	Aecotink, Virginia	
Sharpe, Walter K.	Chambersburg	Franklin
Shearer, G. E.	Morrisville	Bucks
Shearer, Walter J.	Vinemont	Berks
Sheble, Earle	Hamburg	Berks
Sheely, A. D.	Arendtsville	Adams
Sheibley, J. W.	Alinda	Perry
Sheller, Charles W.	West Chester	Chester
Shetron, W. F.	Chambersburg, R. 6	Franklin
Shields, C. E.	Roxbury	Franklin
Shields, Ira M.	Chambersburg, R. 5	Franklin
Shirk & Baker	West Middlesex	Lawrence
Shockey, Luther P.	Chambersburg, R. 10	Franklin
Shorb, Albert	Hanover	York
Shoverm, D. J.	Mechanicsburg	Cumberland
Shull, Robert H.	McKnightstown	Adams
Sidler, A.	York, R. 9	York
Siegler, Franklin	Takoma Park, Washington, D. C.	
Simons, R. B.	Starling	Wayne
Skinner, H. W.	Chambersburg	Franklin
Slaybaugh, Elmer	Aspers	Adams
Small, George	Wyoming	Luzerne
*Smedley, Samuel L.	Newtown Square	Delaware
Smedley, S. L., Jr.	Newtown Square	Delaware
Smedley, Walter	Media	Delaware
Smith, C. M.	Lewistown	Mifflin
Smith, Edwin	Royersford, R. D.	Montgomery
Smith, E. T.	E. Stroudsburg	Monroe
Smith, G. E.	Bethlehem, R. 4	Lehigh
Smith, G. Frank	Aspers	Adams
Smith, G. Walter	Smithsburg, R. 1, Md.	
Smith, J. Arthur	Chambersburg, R. 10	Franklin

* Life Members.

Name	Post Office	County
Smith, J. H.	Chambersburg	Franklin
Smith, Leonard R.	Meadville, R. 8	Crawford
Smith, S. A.	Yoe	York
Smith, Noah	Lewistown	Mifflin
Snively, A. H.	Lancaster, R. 4	Lancaster
Snively, Henry B.	Lititz, R. 5	Lancaster
Snively, H. Meyer	Lebanon, R. 8	Lebanon
*Snively, H. H.	Willow St., Lancaster	Lancaster
Snively, The Misses	Lebanon, R. 8	Lebanon
Snowberger, A. I.	Waynesboro, R. 1	Franklin
Snyder, C. B.	Ephrata	Lancaster
Snyder, E. B.	Jacks Mt.	Adams
Snyder, Elmer R.	Masonic Homes, Elizabethtown	Lancaster
Snyder, T. S.	Brodbecks	York
Spangler, Geo. E.	Gettysburg	Adams
Staffer, Aaron O.	Ephrata, R. 3	Lancaster
Stahle, C. E.	Gettysburg	Adams
Stark Brothers	Louisiana, Mo.	
Starner, A. E.	Aspers	Adams
Starkey, S. H.	Bustleton	Philadelphia
Starry, W. R.	York Springs	Adams
Stauffer, Enos O.	Ephrata, R. 2	Lancaster
Stauffer, Samuel O.	Stevens, R. 1	Lancaster
Stauffer, T. H.	Lititz, R. 4	Lancaster
Stear, J. R.	Chambersburg	Franklin
Stein, Geo. E.	Wrightsville, R. 1	York
*Stem, Dr. J. C.	Lemoyne	Cumberland
Stephens, H. M.	111 S. College St., Carlisle	Cumberland
Stephens, J. A.	Honesdale	Wayne
Stevenson Bros.	Midvale	Franklin
Stewart, William	Landisburg	Perry
Stitzer, C. E.	Millmont, R. 1	Union
Stock, Adam	Wyoming, R. D.	Luzerne
Stock, E. C.	3610 Clifton Ave., Baltimore, Md.	
Stock, G. M.	Idaville	Adams
Stock, McClain,	Security Bldg., York	York
Stockton, Manley	Biglerville	Adams
Stolfur, Isaac N.	Ronks	Lancaster
Stoner, Benjamin	Hellam	York
Stoner, H. S.	Orrtanna	Adams
Stoner, H. S.	Clark's Green	Lackawanna
Stottlemyer, E. D.	Boonsboro, Md.	
Stoudt, D. M.	Hershey, R. 1	Dauphin
Stough, Mulford	Shippensburg	Cumberland
Stover, Dr. J. G.	Bendersville	Adams
*Strasbaugh, E. F.	Orrtanna	Adams
Strode, A. Darlington	West Chester	Chester
Strode, Marshall	West Chester, R. D.	Chester

* Life Members.

Name	Post Office	County
Strong, Geo. C.	Orrtanna	Adams
Struble, Vern T.	Athens, R. 2	Bradford
Supiot, A. V.	Cornwall	Lebanon
*Swank, Luke H.	Johnstown	Cambria
Swartz, Samuel	Spring Grove	York
Swartz, Samuel L., Jr.	Spring Grove	York
Tarbert, D. F.	Dallastown, R. 1	York
Taylor, A. M.	Biglerville	Adams
Taylor, Daniel R.	Biglerville	Adams
Taylor, George P.	Biglerville	Adams
Taylor, Henry	Biglerville	Adams
Taylor, Jacob F.	Arendtsville	Adams
Taylor, Porter R.	Bureau of Markets, Dept. of Agriculture, Harrisburg	Dauphin
*Taylor, Ralph S.	325 N. Matlack Ave., West Chester	Chester
Thayer, Paul	State College	Centre
Thomas, Mrs. Annie M.	Gettysburg	Adams
Thomas, Carl	West Chester	Chester
Thomas, Charles E.	Wayne, R. 1	Delaware
*Thomas, Charles L.	King of Prussia	Montgomery
*Thomas, Edwin W.	King of Prussia	Montgomery
Thompson, G. R.	Gettysburg	Adams
Tice, L. L.	Hummelstown	Dauphin
Tolbert, Henry	Chambersburg, R. 11	Franklin
Topper, Z. F.	Emmitsburg, Md.	
Torr, W. H.	Mechanicsburg	Cumberland
Trax, R. L.	Library	Allegheny
Treible, C. E.	Meshoppen	Wyoming
*Trexler, Harry C.	Allentown	Lehigh
Trostle, Francis	York Springs, R. D.	Adams
Trostle, F. C.	Gardners	Adams
Trump, Chas.	Lebanon, R. 5	Lebanon
*Tyler, W. D.	Dante, Virginia	
Tyson, A. R.	Norristown, R. 1	Montgomery
*Tyson, Chester J.	Flora Dale	Adams
*Tyson, Edwin C.	Flora Dale	Adams
*Tyson, William C.	Guernsey	Adams
U. S. Lumber & Box Co.	24-26 Stone St., New York, N. Y.	
Uncle Peter's Fruit Farms, Inc.	Mt. Carmel	Northumberland
Vance, Chas. T.	Orrtanna	Adams
Vandergrift, Wm.	West Chester	Chester
Veshore, Jacob	Ely	York
Vogel, E. H.	Lancaster, R. 3	Lancaster
Wagner, Chas. E.	Mont Clare	Montgomery
Walker, James F.	Westtown	Chester
Walter, J. C.	Biglerville	Adams
Walter, M. T.	Biglerville	Adams
Walton, R. C.	Arendtsville	Adams

* Life Members.

Name	Post Office	County
*Walton, Robert J.	Hummelstown	Dauphin
Warfel, John H.	Roherstown	Lancaster
Watts, D. H.	Kerrmoor	Clearfield
Watts, Gilbert S.	Bellwood	Blair
Watts, R. L.	State College	Centre
*Weaver, Abram	Windber	Somerset
Weaver, Chas. C.	Bendersville	Adams
Weaver, C. F.	York, R. 9	York
Weaver, D. I.	Gettysburg	Adams
Weaver, Edward A.	Fayetteville	Franklin
Weaver, Elmer J.	Ronks	Lancaster
Weaver, M. M.	Mountville	Lancaster
Weaver, W. C.	Bendersville	Adams
Weaver & Leas	York, R. 9	York
Weber, G. G.	York	York
Weidner, A. I.	Arendtsville	Adams
*Weigel, H. M.	Harrisburg	Dauphin
Weinberger, J. H.	Zionsville	Lehigh
*Weimer, E. A.	Lebanon	Lebanon
Weinschenk, W. H.	New Castle	Lawrence
Welsh, Geo. W.	Moylan	Delaware
Welshams, M. O. & Sons	Jersey Shore, Box 60	Lycoming
Wenger, G. P.	Quarryville, R 1	Lancaster
Wenger, M. P.	Denver	Lancaster
Wenker, W. G.	Camp Hill	Cumberland
Wernig, Chas. M.	York, R. 2	York
Wertsch, Edwin	Lititz, R. 5	Lancaster
*Wertz, D. Maurice	Waynesboro	Franklin
*Wertz, Geo. M.	Johnstown	Cambria
Wertz, S. H.	Reading, R. 2	Berks
*Westrick, F. A.	Patton, R. 2	Cambria
Wheeler, C. B.	Hunlock Creek, R. D.	Luzerne
Whisler, A. K.	Etters	York
*Whisler, Edgar	Etters, R. 1	York
*White, Arthur H.	Pulaski	Lawrence
White, C. L.	261 S. 3d St., Philadelphia	Philadelphia
Whiteford, Clay P.	Whiteford, Md.	
Williams, A. B. C.	York Springs	Adams
Wible, R. E.	Gettysburg	Adams
Williams, David L.	Wilkes-Barre, Box 251	Luzerne
*Williams, Irvin C.	Royersford	Montgomery
Williams, John	White Haven	Luzerne
Williams, J. L.	Gettysburg	Adams
Williams, M. I.	Gettysburg	Adams
Wilson, B. F.	Biglerville	Adams
Wilson, C. C.	Sharpsburg, R. 2	Allegheny
Witmer, Jacob G.	Pequea, R. 1	Lancaster
Wingert, J. K.	Chambersburg	Franklin

* Life Members.

Name	Post Office	County
Winters, B. J.	1440 Wyoming Ave., Forty Fort	Luzerne
Winters, J. H.	Dallas, R. D.	Luzerne
Winters, M. L.	Hellam, R. 1	York
Wishard, W. H.	Chambersburg, R. 9	Franklin
*Wister, John C.	Germantown	Philadelphia
*Witherow, R. T.	Punxsutawney	Jefferson
Witherspoon, D. Erskine	Chambersburg, R. 9	Franklin
Witmer, John B.	Lampeter	Lancaster
*Wolfe, Charles A.	Aspers	Adams
Wolfe, Chas. M.	York Springs	Adams
Wolfe, Harry E.	Aspers	Adams
Wolff, B. F.	Lima	Delaware
Wolff, Paul	Myerstown	Lebanon
Wolff, Dr. W. E.	Arendtsville	Adams
Wolper, D. L.	Norristown, R. 3	Montgomery
Woodley, C. A.	Benton Harbor, Michigan	
*Woods, Edward A.	Frick Bldg., Pittsburgh	Allegheny
Worst, D. C.	Carlisle	Cumberland
Worthington, Russell	West Chester	Chester
Wotring, Oscar	Seidersville	Northampton
Wright, Ryland	Aspers	Adams
Wrightstone, N. E.	Camp Hill	Cumberland
Yiengst, John	Lebanon, R. 5	Lebanon
Yerger, C. R.	Apollo, R. 3	Armstrong
Yoder & Handrich	Orrtanna	Adams
Yohe, George S.	Spring Grove, 146 East St.,	York
Yohe, Thomas E.	Menges Mills	York
Young, A. F.	North East	Erie
Young, Fred	Ellwood City, R. 1	Lawrence
Young, J. P.	Chambersburg, R. 8	Franklin
*Youngs, L. G.	North East	Erie
Yost, P. L.	Sugarloaf, R. D.	Luzerne
Zeigler, J. A. C.	1018 W. Locust St., York	York
Zimmerman, H. S.	La Park	Lancaster
Zook, I. F.	Curryville	Blair
Zullinger, T. A.	Chambersburg	Franklin

* Life Members.

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END OF YEAR

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